March 1, 1956

The IRON AGE

The National Metalworking Weekly

Economist Janeway:

Lowers Boom On "Business Cycle" Theory

P. 30

Digest of the Week P –2

Here's a story that COUNTS

. . . Tool Life INCREASED 33⅓% by using COPPERWELD 8620 LEADED ALLOY STEEL

A manufacturer of hydraulic pumps was averaging 7200 pieces per set of tools used in milling slots on this hydraulic pump rotor. By switching to Copperweld Leaded Steel, this tool life was increased to 9600 pieces.

In addition to longer tool life, leaded steel gives faster feeds and speeds, and a finer finish often eliminates a clean-up operation—truly, the steel with "built-in productivity." To put more operating profit in your production picture, try Copperweld Leaded Steels.

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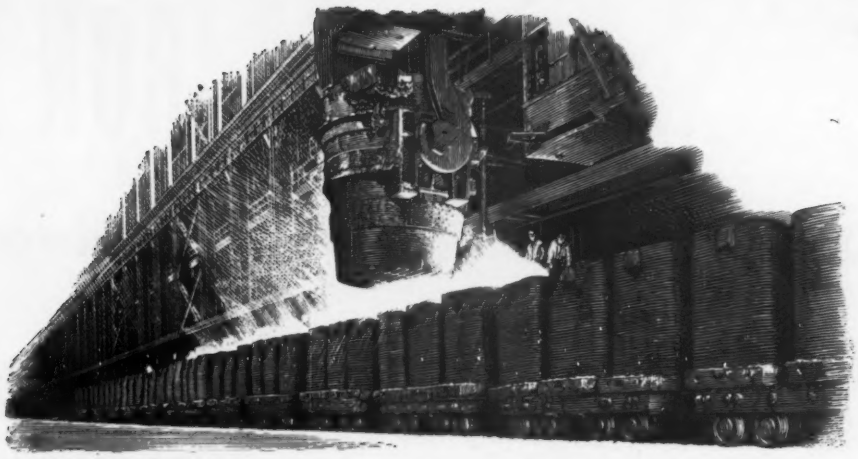

Meeting the Demand

The following message from E. G. Grace, Chairman of Bethlehem Steel, appears in the company's Annual Report to Employees for 1955. If you would like to see the report, your request to us at Bethlehem, Pa., or the nearest Bethlehem office, will bring a copy to you promptly.

To the Employees:

It is very gratifying to report that our mutual efforts last year resulted in the production and shipment of more steel than ever before in Bethlehem's history.

The expansion and improvement of our facilities to meet a growing demand for steel products have brought benefits to our company and employees through increased production and earnings.

It was a notable year, one which showed that our large investments for growth have been bearing fruit. We cannot stop here.

The United States is growing and the steel industry must keep pace with that growth. Our rising population with its steadily increasing per capita consumption of steel creates a demand for goods using steel which must be supplied by private enterprise.

Bethlehem's response has been to launch the greatest expansion program in the company's history. Within the next two years we shall spend some $300,000,000 in adding more than 3,000,000 tons of annual ingot capacity.

In recognition of the needs of the country, the steel industry as a whole is planning the addition of 15,000,000 tons of annual ingot capacity in the next three years.

The financing of such a program is not an easy task. In the past, much of the expansion was brought about by improving or adding to existing installations. However, additions to capacity in this manner cannot continue indefinitely. In the future, the industry, and Bethlehem, must create entirely new capacity—integrated from raw materials to the finished product—to serve properly the demand of the public. This is much more costly.

For this reason we must maintain adequate earnings to attract investors and to have funds to put back into the business. This requires the maintenance of sound financial practices, realistic price and wage policies and continuing progress on the technological front. But, we must have also an enlightened public policy to assist us by means of sound government tax policies which will encourage expansion and development.

We have been presented with many problems in our endeavor to meet the great demand for steel that occurred during the last half of 1955. New problems will arise. But the response of our employees through record production last year shows what can be done.

I am confident that the demand for steel will remain strong throughout the year. Our shipbuilding prospects are improving significantly. In short, the immediate future is clear and promising. But the long range job, with all it implies, lies ahead. Production performance such as we had in 1955 will immeasurably ease our task.

The maintenance of steel as a free industry in a free economy is vital to our personal liberties. The growth of the industry is essential to our economy because steel is a basic ingredient. I am sure Bethlehem will do its part.

E. G. Grace

CHAIRMAN

BETHLEHEM STEEL

DIGEST OF THE WEEK IN METALWORKING

March 1, 1956—Vol. 177, No. 9

The IRON AGE

Digest of the Week in Metalworking

Starred items are digested at right.

EDITORIAL

Is Dip in Housing Starts Worrying You? 7

NEWS OF INDUSTRY

*Production: Tool Shops Share Auto Gains 27
*Marketing: Color TV Backs Electronic Boom ... 29
*Special Report: Economist Offers New Theory .. 30
*Management: Employee Dishonesty Can Hurt .. 34
*Manufacturing: Prepatterned Tubes Sell Well .. 36
Personnel: Iron Age Salutes 57
Iron Age Introduces 59

NEWS ANALYSIS

Newsfront 25
*Report to Management 41
*Automotive Assembly Line 44
*This Week in Washington 49
*West Coast Report 53
*Machine Tool High Spots 55

TECHNICAL ARTICLES

*Channel Struts Speed Construction 67
*Fluxless Aluminum Joining Avoids Corrosion .. 71
*Foolproof System Double Checks Inventory 74
*Check Limits of Controlled Shot Peening 76
*Setup Welds Aluminum Tubing Joints 80
Carbide Reamer Outproduces Six Grinders 82
Technical Briefs 92
Materials Roundup 106

MARKETS & PRICES

*The Iron Age Summary—Steel Outlook 123
Steel Product Markets 124
Comparison of Prices 125
Iron and Steel Scrap Markets 126
*Nonferrous Markets 130
Steel Prices 133

REGULAR DEPARTMENTS

Free Literature 84
New Equipment 108

INDEX OF ADVERTISERS 152

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Chestnut and 56th Sts. Philadelphia 39, Pa.

NEWS DEVELOPMENTS

TOOL SHOPS BOOM WITH AUTO BUSINESS P. 27

Big model changes plus rush for early model introduction send tool and die shops into peak production. Record business is in sight, but with accompanying problem of labor shortages.

EMPLOYEE DISHONESTY LOSSES MOUNT P. 34

Losses to business and industry from employee dishonesty may reach $500 million in 1955. Metalworking firms have all risks of business plus added problem of scrap losses. As a difficult commodity to control, scrap has way of disappearing. Here are tips on how to cut dishonesty losses.

PREPATTERNED TUBES FIND READY MARKET P. 36

Tubes built into sheet and strip have many applications in heat exchanging field. Olin-Mathieson, Reynolds, Revere are early entries into growing field. Product may be answer to continuing auto radiator problem. Refrigeration is biggest market to date. Construction has big possibilities.

DON'T FEEL BAD ABOUT BIG '55 PROFITS P. 41

Business profits rose 22 pct last year. National income moved up only 7½ pct. But business earnings fell way off in 1953 while payrolls held steady. Things are normal now.

AUTO HORSEPOWER HEADED UP AND UP P. 44

New loads imposed on engine by driving aids are all big horsepower consumers. Not all power talk is based on advertising and sales. There are valid reasons for added power.

NEW CONCEPT of "defense cycle" forecasting for business is advanced by Economist Eliot Janeway. He cites records of past years as proof, sees boom extending through 1956. Inflation a possibility—See P. 30.

AIR FORCE SEES NEXT WAR SHORT BUT SAVAGE P. 49

Air Force generals are saying the next war will be over after a quick nuclear exchange. Predictions of sweeping damage bring new pleas for industry dispersal but little action. Limited dispersal incentives offered so far have brought relatively little scattering of defense facilities.

FEATURE ARTICLES

CHANNEL STRUTS MAKE SHORT WORK OF CONSTRUCTION P. 67

A system combining (1) standardized construction, (2) precision formed interchangeable parts and (3) simplified assembly, is achieving some startling results on new construction projects. Roll-formed members are assembled on the job in less than ⅓ usual time. Costs are competitive.

FLUXLESS ALUMINUM JOINING AVOIDS CORROSION P. 71

Good cleaning only reduces the possibility of joint corrosion due to residual or entrapped flux in soldering, brazing and welding of aluminum. Most techniques avoiding flux require special procedures or equipment. A recently developed self-fluxing aluminum solder bypasses all these problems, joins easily and economically at low temperatures. Aluminum oxide surface film can be ignored. Compatible lead-zinc blend bonds securely.

FOOLPROOF SYSTEM DOUBLE CHECKS INVENTORY P. 74

Trouble-free inventory still is a dream in most plants. Yet the reality may be a lot closer and simpler than most realize. Here's one low-cost approach. Double check of each count makes for the highest accuracy. Responsibility for miscounts also is pinpointed without reflecting on ability of the checker.

TEST LIMITS OF CONTROLLED SHOT PEENING P. 76

Shot peening can make an important contribution to improving the fatigue life of metals. It can also provide a surface finish which reduces the chance of part failure But shot peening isn't infallible. It can be misapplied. Knowing the "do's" and "don'ts" helps make your shot-peening operations more effective, more profitable.

PUSHBUTTON SETUP WELDS ALUMINUM TUBING JOINTS P. 80

In making aluminum evaporator assemblies for refrigerators, Hotpoint Co. brazes aluminum coils to aluminum sheet. After forming, it is necessary to connect the pipes extending from the coil to the remainder of the system. This is done by Heliarc welding aluminum-to-aluminum joints, by silver-brazing copper joints.

MARKETS AND PRICES

COLOR TV BRIGHTENS MARKET PICTURE P. 29

Manufacturers are set to take the wraps off color TV. This year about 250,000 sets will be sold. By 1960, color sets will account for 32 pct of TV sales. Entire industry strong.

SPOTLIGHT BEAMS ON SAN FRANCISCO P. 53

This week's West Coast Report points up the rapid strides the Golden Gate city is making as an industrial center. Facts and figures speak well for metalworking. They're timely tips which may spell new markets for you.

BOOM LEAVES MACHINE TOOL MEN STILL WARY P. 55

Machine tool new orders for January dipped slightly from previous month but were well over $100,000 again. Sustained spurt has builders hoping for first $1 billion year but costs and lagging areas still check optimism.

SHIFTING AND HAULING IN STEEL MARKET P. 123

Some steel producers are shifting their tactics. The changing supply-demand picture has (1) persuaded some mills to re-enter hot-rolled sheet market and (2) to roll light plates on sheet mills. Market still strong.

COPPER PRICES STAY IN THE SPOTLIGHT P. 130

Lake producers, custom smelters, London and scrap markets all follow electrolytic price up. Future silver lining is Copper & Brass Research Assn.'s bigger capacity prediction.

NEXT WEEK:

WHAT'S THE LATEST ON TOOL CONTROL TAPES?

Interest in control tapes for automated machines continues to mount. Next week's story brings you up-to-date on tape applications, advantages, limitations. Whether you're running a small shop or making automobiles you'll want to know what others are doing in this fast-moving field.

HOW TO GET MORE FOR YOUR TOOLING DOLLAR

This special feature offers tool engineers, production men, and purchasing agents workable ideas on how manufacturing plants can get more for each tooling dollar. Suggestions are from top tooling experts, range from fundmentals of part design to selection of equipment, accessories.

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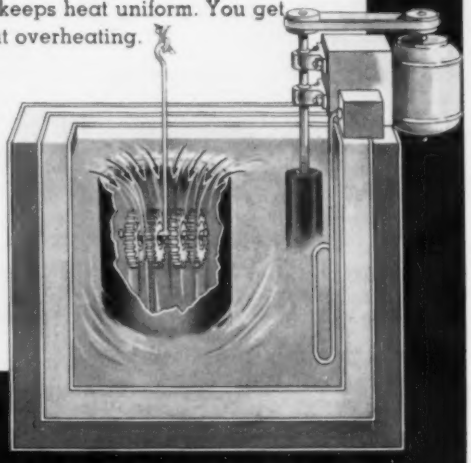

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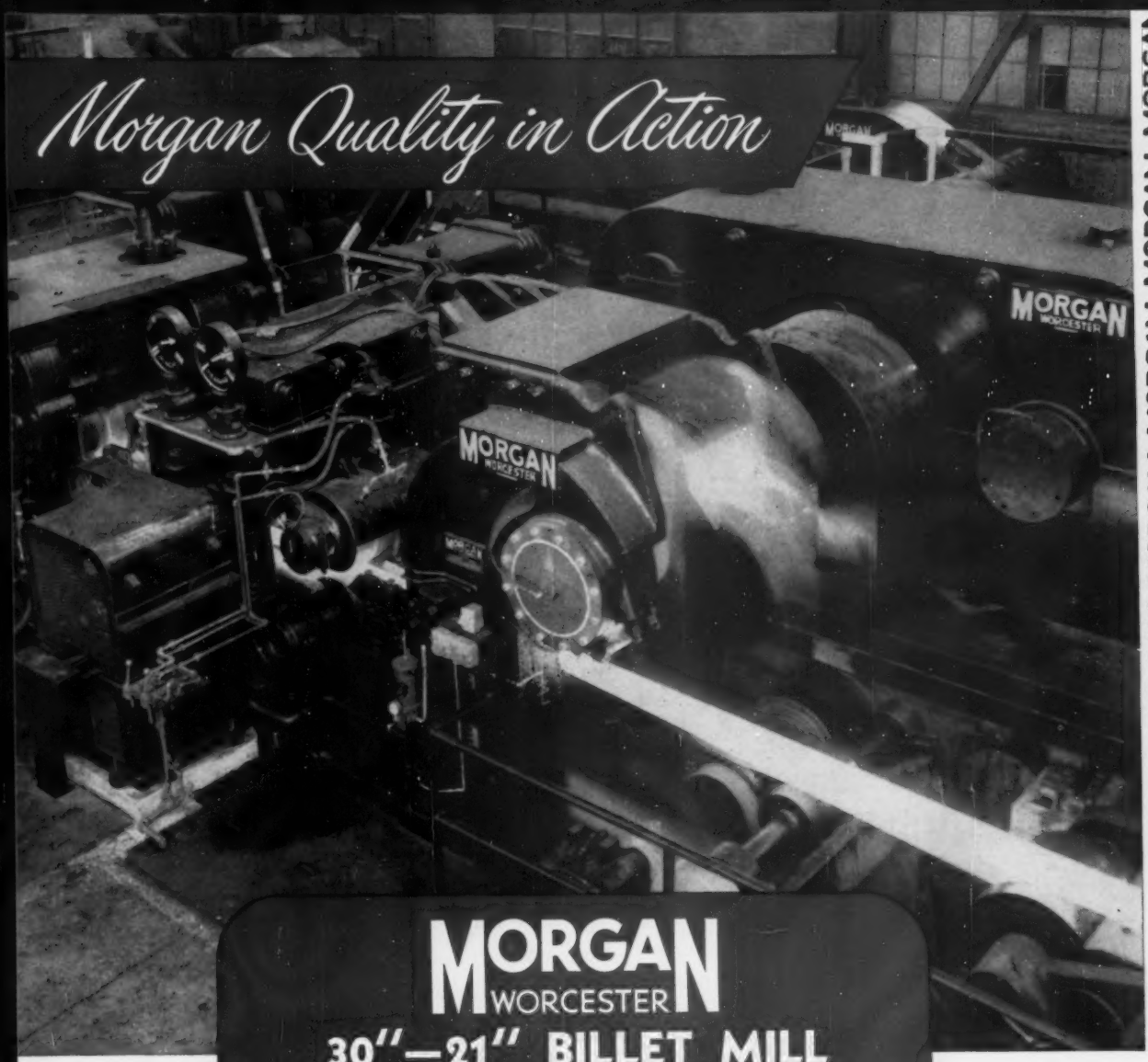

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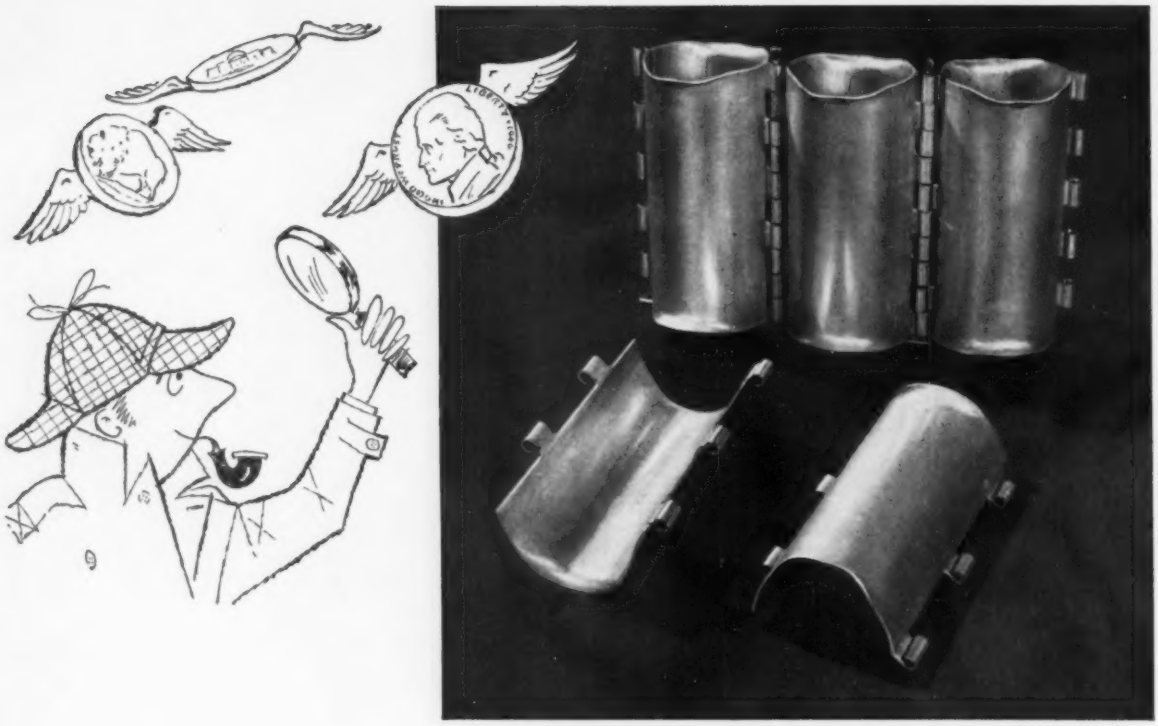

How Armco ALUMINIZED STEEL Helped Solve The Case of The Missing Nickels

Nickels were "disappearing" from soft drink vending machines. At least that's what the operators thought. However, investigation revealed that the machines' non-ferrous chain conveyor links were stretching so much customers could get two bottles for only one nickel.

Armco ALUMINIZED STEEL was called into the case and solved it. The manufacturer was able to make a strong, non-stretching link with the needed corrosion resistance.

This 2-in-1 metal, sheet steel coated in molten aluminum, offers an unusual combination of properties that may help you solve some of your problems and cut costs too.

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ALUMINIZED STEEL has the strength of steel plus the surface properties of aluminum. It also gives high heat reflectivity and heat resistance. Up to 1250 F the coating on Type 1 ALUMINIZED STEEL remains intact.

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For complete information on how you can use Armco ALUMINIZED STEEL to cut production costs and give your products added sales appeal. just fill in and mail the coupon.

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BPA NBP

EDITORIAL

Don't Worry About Housing

◆ THERE HAS BEEN a big worriment in industry over the "decline" in the rate of housing starts. For the past few months the trend has failed to keep going through the roof.

All kinds of dire interpretations by the experts have been placed on this statistical change. Some have predicted a steeper drop for the future. Some have blamed credit and overbuilding for the mild readjustment. Still other soothsayers have been ready to predict an end to large scale building.

In the past few weeks the chartists—who deal in month-old figures—point out that January housing starts weren't too bad. Now some people feel a little better; or at least less anxious. All of which proves nothing.

The decline—if it can be called that—in home building starts was given more attention than it deserved in its relation to the whole economic picture. Just as the auto cutbacks were overemphasized so were home building figures.

There is no decline in the potential for home building. As long as it is relatively cheaper to build than to rent we will have housing projects—and plenty of them. As long as people marry and have children at the current rates we will need more homes. As long as individuals and families move from the farm to the city we will need places for them to live.

The major reason why home building slowed down—aside from the overplayed credit reason—was because it was bumping along the top of capacity to build. Material was hard to get. The weather had been foul and some builders wanted a "breather."

Higher wages and more jobs this year mean more "upgrading" in homes. That is a certainty. With more people retiring there will be a step-up in home building for these people; because many prefer to live alone and in a house.

Housing is important. It is a good indicator of future sales in appliances, furniture, roads, autos, utilities, metals and machinery. It is taking a slight pause before it leaps ahead again. While it's doing this, commercial building is now trying to catch up with the housing starts of two years ago.

Don't waste your time worrying about housing starts.

Tom Campbell

EDITOR-IN-CHIEF

VALLEY MOULD AND IRON CORP.

General Offices: HUBBARD, OHIO

Western Office: Chicago, Ill. • Northern Office: Cleveland, O.

dear editor:

letters from readers

Are We Losing Our Guts?

Sir:

Just finished your fine editorial of February 9 entitled "Are We Losing Our Guts?"

It occurred to me that you might want to use an excellent source for additional material for similar hard hitting editorials.

This source is the Foundation for Economic Education, Irvington-on-Hudson, New York. They are doing an outstanding job, and I am doing my best to help them.

Enclosed are some samples of their material, including "The America We Lost," "Equality & Security," "The Growth of an Idea," "Ideas on Liberty," which you may find helpful. *K. S. Wood, President, Wood Brothers Manufacturing Co., Oregon, Ill.*

Stainless $

Sir:

I would like to send along my thanks for the action taken on our behalf in getting reprints of "How To Get More For Your Stainless Steel Dollar." We think this is a darn good informative article and one that we intend to exploit to the fullest.

We believe that there is a definite need in our industry for a great deal of basic information about stainless steel. There is plenty of technical literature available but until it's translated into everyday language, most non-technical people either file it or toss it away.

We're on your side. Keep up the good work. *C. O. Parrott, Advertising Dept., G. O. Carlson, Inc., Thorndale, Pa.*

Continuous Al Furnace

Sir:

In your September 1 issue you published "New Radiant Furnace Continuously Melts Aluminum." On page 102 the following sentence appears: "The new furnace design, engineered and built by Selas Corp., Philadelphia, is gas fired through radiant-type burners."

We are afraid that if we do not call this particular point to your attention at this time, there will be a substantial danger that other interested parties may further publicize this sentence. The sentence is not factual. The original furnace was engineered and constructed by Monarch. Selas acted as consultants only in the direct application of their burner units which Monarch purchased from them, but Monarch actually built the furnace and installed the Selas burner units. *R. I. Kopper, Executive Assistant, Monarch Aluminum Mfg. Co., Cleveland, Ohio.*

Religion in Industry

Sir:

In the October 27, 1955, issue of THE IRON AGE, you briefly reported on a meeting in Albany, New York, sponsored by the Episcopal Diocese of that city in which was discussed the theme—"Religion and work go together." You stated that the proceedings will be published for widespread distribution.

Would you kindly advise where this book may be purchased? *J. H. Pohlman, President, Pohlman Foundry Co., Buffalo, N. Y.*

You may secure a copy for $3.00 by writing: Albany Diocesan Bookstore, 68 South Swan St., Albany 10, N. Y.—Ed.

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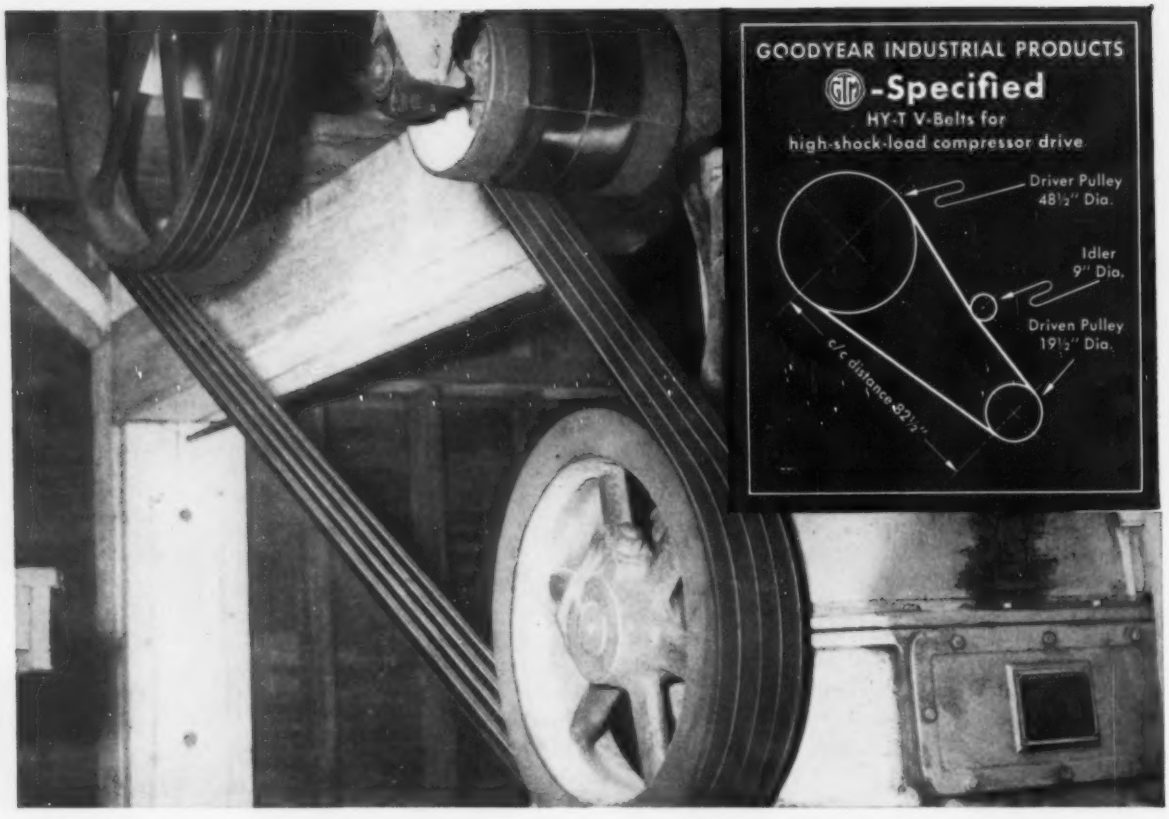


Saved the cost of 3 sets of belts

and still going strong on tough compressor drive

BELT-BREAKING problem for a Southern lumber company was overloading on a compressor drive. Frequent and sudden shock-loads kept belt-life down to 6 months, meant costly shutdowns and expensive replacements.

Called in for consultation, the G.T.M.—Goodyear Technical Man—recommended HY-T V-Belts. Their multiple plies of chemically produced 3-T CORD are tempered by Time, Tension and Temperature to eliminate surplus stretch. They can carry 40% greater horsepower loads at speeds from 100 to 6,000 f.p.m.—have maximum resistance to oil, moisture, mildew and static generation.

Result: The HY-T V-Belts easily took the shock-loads in stride and at last report were still running after 24 months—4 times the service life of the standard V-belts they replaced—saving the cost of 3 sets of belts.

If you have drive troubles call in the G.T.M.—the man who knows V-belts best. Contact him through your Goodyear Distributor or by writing to:

Goodyear, Lincoln, Nebraska or Akron 16, Ohio

YOUR GOODYEAR DISTRIBUTOR *can quickly supply you with Hose, Flat Belts, V-Belts, Packing or Rolls. Look for him in the yellow pages of your Telephone Directory under "Rubber Products" or "Rubber Goods."*

Hy-T—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

HY-T V-BELTS with 3-T CORD by

GOODYEAR

THE GREATEST NAME IN RUBBER

fatigue cracks

by William M. Coffey

Tool Steel Guide

The Tool Engineers Show issue coming next week (March 8) will be the plus of all plus values, the specialist of all special issues. We've already mentioned that you will get another dollar saving article as part of the How-to-Get-More-For-Your-Metalworking-Dollar series that has received such a warm reception from our readers in all walks of metalworking life. The newest in the series will be "How to Get More For Your Tooling Dollar."

Over and above this, however, we are adding a Tool Steel Guide for this issue. The Tool Steel Guide will be in three sections: (1) comparable tool steel brands (2) composition of all the major AISE-SAE tool steels (3) selection guide, forging and heat treatment of all these steels.

The comparable brands will be listed in chart form, showing major brands of all U. S. and Canadian tool steel manufacturers. These are the charts which for years have been the backbone of THE IRON AGE "Tool Steel Directory." They have been revised, of course, and have been practically doubled in scope to make them even more useful.

In short—this will be a directory of more than 500 tool steels based on listings supplied by all U. S. and Canadian tool steel manufacturers. It will provide the AISI number, chemistry, physical properties, forging and heat treating data on all these steels.

Reprints of both "How to Get More" and the "Tool Steel Guide" will be offered free to our readers.

Letters

From time to time we have reprinted letters from a wonderful little booklet entitled "The Wolf Magazine of Letters" published by the Wolf Envelope Company, Cleveland. We have the latest edition and can't help but print two of them.

Milkmen, on their morning rounds, often find the strangest correspondence in empty milk bottles; these two notes, for example:

Dear Milkman:

Will you please be kind this week and not slam front door? Am on vacation and do not have to rise at 7 a.m. You can begin slamming it again next week as I have to get up anyhow. Thanks.

* * *

To our Milkman:

We don't want milk every day. We want it like this:

Today we want milk.

Tomorrow we don't want milk.

And the next day will be just like the day before and the day after, like tomorrow.

Company Punishment

The Editorial Dept. has again put us on report for Captain's Mast for a very, very slight infraction concerning what it terms an exaggeration that appeared in this column on Feb. 16. We remarked that out of a total of 3646 pages of editorial matter carried in 1955 (not counting the 100th Anniversary Issue) there had been 52 pages of Fatigue Cracks. This column should have been credited, they say, with 34.67 pages on account of the fact, they say, that one robin doesn't make a spring and two columns don't make a page. Well, really.

Puzzlers

We misstated the Mule puzzler (Feb. 2) but everybody got it right anyway. This will probably get us on report again. Answer: Eustace had 7 mules, Angus had 5. Winners: R. W. Hautzenroeder, C. Ritter, Roy Darrell, Arthur A. Coffin, Jr., Jim Mull (who could have solved it), C. M. Houston, Harold Leidy, Ed Sterley, Sarie and the GSCLAPC, and Bob Castle.

Whatever your particular cutting operations, there are Victor Hand and Power Hacksaws, Metal and Wood Cutting Band Saws and Hacksaw Frames to meet your specific requirements.

Every Victor distributor can give you prompt delivery of any metal cutting saw you want. His men are backed up by Victor factory experts who can show you the way to new speed and economy on production metal sawing operations.

Remember, no blade on the market will cut faster or last longer than the right Victor Blade – at the price you want!

And for top performance at a low price, use Victor "Moly"® High Speed Steel blades. Victor developed this high speed, heavily-alloyed steel blade of molybdenum. Remember, "Moly" High Speed blades outlast standard steel blades 10 to 1, cut as well as the *best* high speed steel blades made, but are substantially lower in cost.

Free!

Ask your Industrial Distributor for a supply of our NEW Metal Cutting Booklets and Wall Charts.

Sold Only Through Recognized Distributors

VICTOR ® 1955

SAW WORKS, INC., MIDDLETOWN, N.Y., U.S.A.

MAKERS OF HAND AND POWER HACKSAW BLADES, FRAMES, AND METAL AND WOOD CUTTING BAND SAW BLADES

NEW MONORAIL CRANE

offers many advantages

For up and over handling this new American MonoRail Crane offers you the following advantages:

- up to 10 ton capacity
- meets low headroom conditions
- extra store room
- carrier service beyond craneway
- fingertip control from floor
- all movement power operated
- low maintenance cost

These are but a few reasons why you should call an experienced MonoRail engineer to help you with your handling problems.

AMERICAN OVERHEAD HANDLING EQUIPMENT

MONORAIL COMPANY

13103 ATHENS AVENUE • CLEVELAND 7, OHIO

[IN CANADA—CANADIAN MONORAIL CO., LTD., GALT, ONT.]

"Up-and-Over" is the title of our 16-mm sound film showing how MonoRail solves many tough handling problems at low cost. Please allow us three weeks to schedule a showing for you.

Member of Materials Handling Institute-MonoRail Association

dates to remember

MARCH

INSTRUMENT SOCIETY OF AMERICA —Sixth annual conference and exhibit, March 5-7, Hotel Webster Hall, Pittsburgh. Society headquarters, 845 Ridge Ave., Pittsburgh

NATIONAL ASSN. OF WASTE MATERIAL DEALERS, INC.—43rd annual convention, March 11-13, Waldorf-Astoria Hotel, New York. Society headquarters, 271 Madison Ave, New York 16.

INTERNATIONAL ACETYLENE ASSN. —56th annual convention, March 12-14, Statler Hotel, Los Angeles. Society headquarters, 30 East 42nd St., New York.

EXPOSITIONS

ASTE—Industrial exposition, March 19-23, Chicago.

MATERIALS HANDLING SHOW, June 5-8, Cleveland.

ASSN. OF IRON & STEEL ENGINEERS, Sept. 25-28, Cleveland.

METAL SHOW—Oct. 8-12, Cleveland.

NATIONAL ASSN. OF CORROSION ENGINEERS — National conference and exhibition, March 12-16, Hotel Statler, N. Y. Society headquarters, 155 E. 44th St., N. Y.

PRESSED METAL INSTITUTE—Annual spring technical meeting, March 14-16, Hotel Carter, Cleveland. Society headquarters, 3673 Lee Rd., Cleveland.

STEEL FOUNDERS' SOCIETY OF AMERICA — Annual meeting, March 19-20, Drake Hotel, Chicago. Society headquarters, 606 Terminal Tower, Cleveland.

FARM EQUIPMENT INSTITUTE—13th industry-research conference, March 28-29, Cornell University, Ithaca, N. Y. Society headquarters, 608 S. Dearborn St., Chicago.

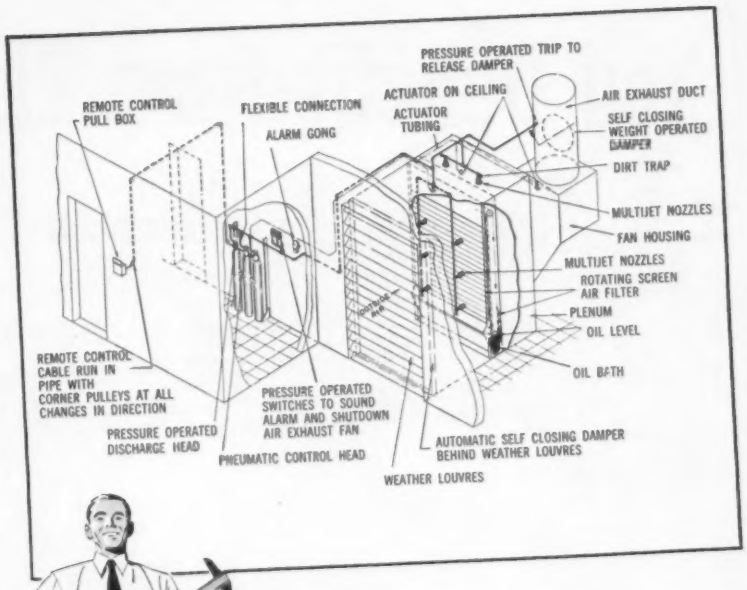
APRIL

MATERIALS HANDLING INSTITUTE—Spring meeting, April 3, Edgewater Beach Hotel, Chicago. Society headquarters, 813 Clark Bldg., Pittsburgh.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION, INC.—Annual spring engineering conference, April 4-6, Lehigh University, Bethlehem, Pa. Society headquarters, 101 Park Ave., New York.

AMERICAN SOCIETY OF LUBRICATION ENGINEERS — Annual meeting and lubrication exhibit, April 4-6, William Penn Hotel, Pittsburgh. Society headquarters, 84 E. Randolph St., Chicago.

METAL POWDER ASSN. — 12th annual meeting, April 10-12, Cleveland Hotel, Cleveland. Society headquarters, 420 Lexington Ave., New York.



Guard oil bath air filters with Kidde engineered fire protection!

LOOK HERE — a fire hazard that could easily turn a building to a heap of cinders — *completely* protected by a tailor-made Kidde CO_2 Fire Extinguishing System! Kidde engineers haven't missed a trick!

At the first sign of fire, rate-of-temperature-rise detectors trigger the system, pressure-operated switches simultaneously close dampers, shut down fans and sound an alarm while fire-killing clouds of CO_2 stop the blaze in its tracks. What protection!

And what features Kidde systems have! Using safe, efficient CO_2, they leave no mess to damage equipment, nothing to clean up after a fire. And their special rate-of-temperature-rise detectors insure *complete* protection 24 hours a day. Kidde systems need no attendance, day *or* night!

Kidde systems have no falling weights, use no clumsy mechanical triggering methods. Pneumatic or Electrical Control Heads insure instant and complete CO_2 discharge. All moving parts of a Kidde system are self-enclosed for safety, need no replacement after a fire, have easy-to-read indicators which show at a glance whether system is "set" or "released." What's more, special Directional Valves let you guard more than one hazard from the same cylinder bank, giving you the most *versatile* protection on the market today!

It's easy to get the *best* in fire protection. For information about *your* specific problems, write Kidde today.

Kidde

Walter Kidde & Company, Inc.
249 Main Street, Belleville, 9, N. J.
Walter Kidde & Company of Canada, Ltd., Montreal—Toronto

The words 'Kidde', 'Lux', 'Lux-O-Matic', 'Fyre-Freez' and the Kidde seal are trademarks of Walter Kidde & Company, Inc.

You Benefit from ELECTROMET'S

through Research * Development

Production * Service

For 50 years ELECTROMET has produced ferro-alloys and metals essential in the production of steel, iron, and non-ferrous metals. Research and development by ELECTROMET during these 50 years have provided the trade with new and better alloys and metals to meet specific needs. Increased emphasis on research and development promises continued benefits in the future.

The ELECTROMET story is one of steady growth and progress for the benefit of the metal industries. When you buy from ELECTROMET, you get the best in alloys and service plus the advantages of long manufacturing experience and extensive research.

Here are some of the advantages you get from ELECTROMET's *integrated programs.*

Competent Metallurgists and Sales Engineers

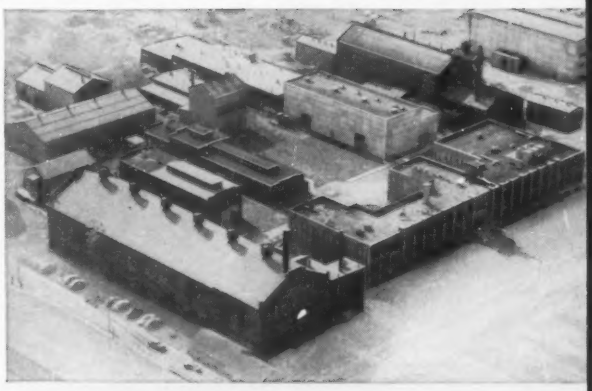
Nine sales and service offices are strategically located in the major steel producing centers as shown on the map above. If you have a problem on metals or alloys, let one of our experienced metallurgists or sales engineers help you. He will be glad to assist you with any problems on the production of quality steels, irons, and non-ferrous metals. Simply telephone or write the ELECTROMET office nearest you.

B Ca Cb Cr Mn Si Ti V W Zr

50 Years of Experience

Continuing Research and Development

Since 1906 ELECTROMET has carried on a three-way program of research, development, and technical service. More than 300 skilled research scientists, engineers, and technicians work in ELECTROMET's Metals Research Laboratories and Development Laboratories at Niagara Falls (shown here). This program provides you with new ferro-alloys and metals, better ways of using them, and new and improved alloy steels and irons. Innovations are fully developed in our laboratories before they are offered commercially.

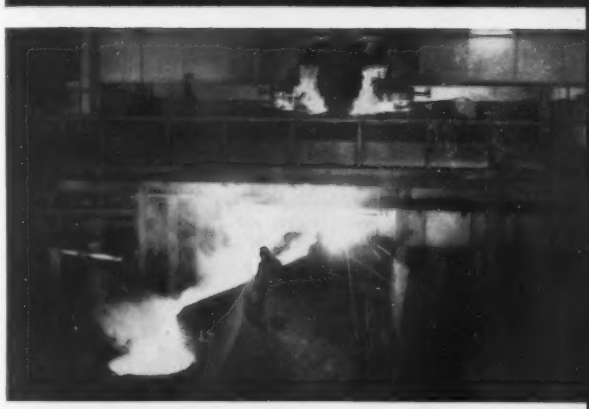


Wide Range of Alloys to Meet Your Needs

Over 50 different products are manufactured to meet the regular requirements of the metal industry as well as the special needs of customers. This wide range of high-quality ferro-alloys and metals is the result of 50 years of research, development, and service by ELECTROMET. ELECTROMET offers the widest selection of ferro-alloys and metals to meet your specific requirements.

Seven Modern Plants—4 With Own Power Facilities

Our plants have been greatly expanded and modernized to meet the current demands for ferro-alloys and metals. The recently completed plant at Marietta, Ohio, is the world's largest ferro-alloy plant. Company-owned power facilities at four of the plants assure a constant supply of power for efficient production. Prompt shipment of ELECTROMET ferro-alloys is assured from all seven plants, and from six warehouses conveniently located to serve you.



World Wide Ore Sources

The availability of ores, and other raw materials is assured by ELECTROMET's diverse facilities, including mines and ore milling plants owned by UNION CARBIDE. Helping to assure adequate ore supplies are the ore buying facilities of Union Carbide Ore Company, a Division of Union Carbide and Carbon Corporation. Ores come from the far corners of the earth to ELECTROMET's plants. On this simplified map of the world, symbols for the chemical elements indicate a few of the major sources of alloy ores.

ELECTRO METALLURGICAL COMPANY

A Division of Union Carbide and Carbon Corporation

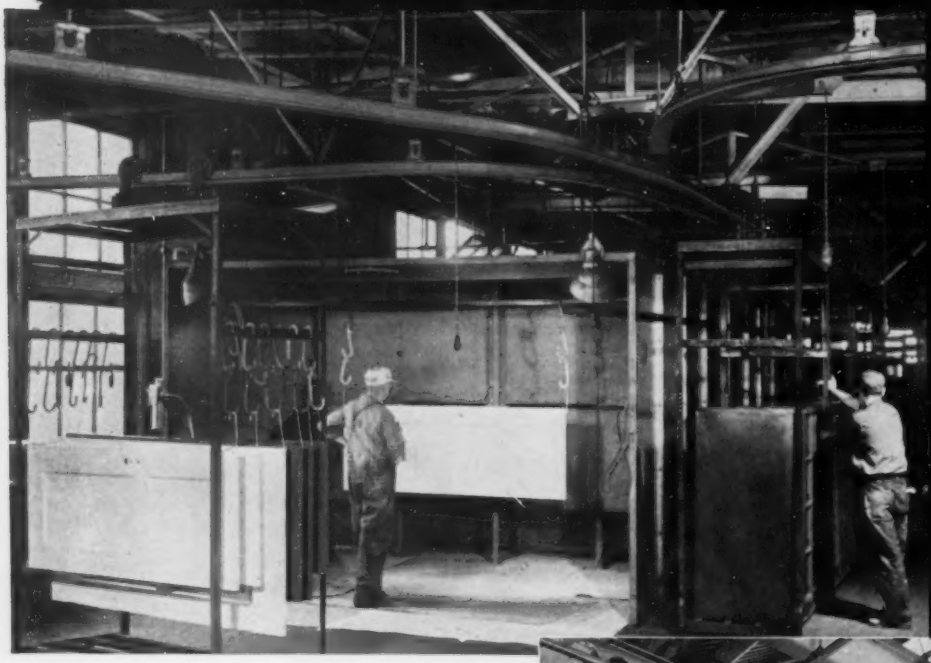
30 East 42nd Street UCC New York 17, N. Y.

OFFICES: Birmingham • Chicago • Cleveland • Detroit • Houston • Los Angeles
New York • Pittsburgh • San Francisco

In Canada: Electro Metallurgical Company, Division of Union Carbide Canada Limited, Welland, Ontario

The term "Electromet" is a registered trade-mark of Union Carbide and Carbon Corporation.

handle freshly painted parts the *EFFICIENT OVERHEAD way*



This rack carrier system speeds the painting of metal doors and filing cabinets. The items are conveyed to and from the spray booth in an even flow without log-jamming.

A three-runway crane simplifies handling of ironing machines and other laundry equipment in this paint room. The middle runway track extends to other parts of the building, enabling loads to be brought directly to the room by the hoist carrier seen at left.

PAINTING and handling parts or complete machines is greatly simplified and speeded by use of an inexpensive Cleveland Tramrail overhead system.

Items may be delivered from fabrication department, painted by spray or dip, and conveyed to assembly or shipping without leaving the tramrail system. Freshly painted pieces are easily moved the overhead way with little danger of being touched or damaged.

Various types of Cleveland Tramrail equipment are available to suit different conditions. Whether it be cranes, rack carrier systems or completely automatic installations, Cleveland Tramrail engineers can advise and serve you.

GET THIS BOOK!

BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy

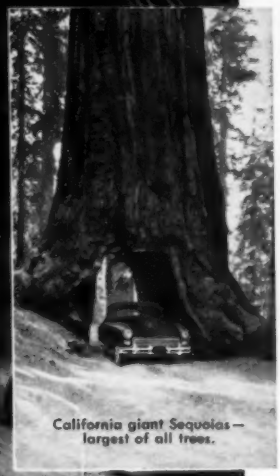
CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
4808 East 284th Street, Wickliffe, Ohio

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

Unsurpassed-anywhere!

IT ALL COMES DOWN to one fact... that you can always count on Roebling high carbon flat spring steel to reduce preparation time, machine stoppages and rejects to a minimum. What's more, it's made as you want it... annealed, hard rolled untempered; scaleless tempered; tempered and polished, blued or strawed.

You *pay* for the best every time you buy flat spring steel. Make sure you *get* it. Specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.



California giant Sequoias—largest of all trees.

ROEBLING

Subsidiary of The Colorado Fuel and Iron Corporation

ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. & 5 PITTSBURGH ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • ROCHESTER, 1 FLINT ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • ST. LOUIS, 3001 DELMAR BLVD • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK

Still in excellent condition after 37 months. One of three nickel steel pinions from the 43" blooming mill of United States Steel Corporation at Youngstown is ready for more gruelling work. Previous pinion life was 5½ months.

3,500,000 tons of steel...their output

Nickel steel pinions excellent after 3 years' use where predecessors averaged 5½ months

WORKING 37 MONTHS without interruption in a 43" blooming mill, three pinions cast in nickel alloy steel produced more than seven times the output of previous pinions . . . and were still in excellent condition.

This performance . . . in a United States Steel Corporation plant . . . reflects the high level of performance offered by cast steel containing nickel.

Producer of the nickel steel pinions, Mackintosh-Hemphill Division of E. W. Bliss Company, Pittsburgh, Pa., cast them in a 3½% nickel, medium carbon steel. Heat treatment developed the following physical properties:

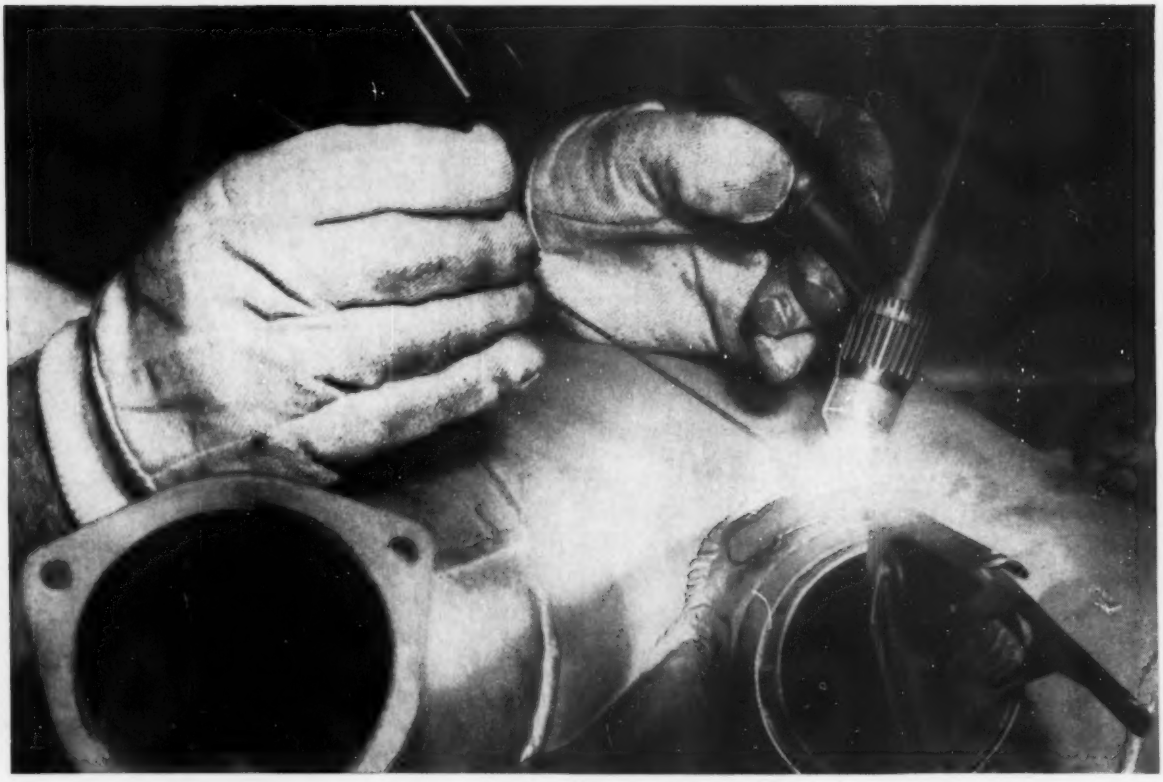
Tensile Strength psi, min.	100,000
Yield Point, psi	70,000-80,000
Elongation % in 2"	25-20
Reduction of Area, %	50-45
Charpy V-Notch Impact, ft.-lb.	20-17
Hardness, Shore	34

The properties of nickel alloys may be controlled to meet both fabricating and service demands. So when you need a metal for improved performance and fewer replacements . . . let's talk it over. A nickel alloy may offer exactly what you want.

Write for . . . "List A" of available publications. It includes a simple form that makes it easy to outline your problem for our study.

INCO TRADE MARK

THE INTERNATIONAL NICKEL COMPANY, INC. 67 Wall Street New York 5, N.Y.



It took only 10 min. to repair this aircraft manifold by HELIARC welding—the savings amounted to $1,485 over the price of a new manifold.

"HELIARC" WELDING SAVES 99%

Of New Part Cost . . .

Throughout industry, HELIARC welding is being used to make repair welds in all types of commercially fabricated metals—at a fraction of new part cost. In the repair operation shown here, a ⅛-in. thick stainless steel aircraft engine exhaust manifold was HELIARC welded and made good as new for $15 . . . the cost for a new manifold would have been $1,500.

Whether used for fabricating or repairing, HELIARC welding is ideal for joining light gage metals. Welding can be done in all positions on all types of joints—with portable manual, and semi-automatic equipment. Mechanized setups are also available.

In HELIARC welding there is no slag, spatter, or smoke. The weld area is argon-gas-shielded from the harmful effects of the atmosphere, and the operator can see and control the weld puddle at all times.

HELIARC welding may be the answer to *your* fabricating and repair problems. Find out—call or write your local LINDE Representative today.

Linde Air Products Company
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
Offices in Other Principal Cities
In Canada: LINDE AIR PRODUCTS COMPANY
Division of Union Carbide Canada Limited, Toronto

The terms "Linde" and "Heliarc" are registered trademarks of Union Carbide and Carbon Corporation.

Linde
Trade-Mark

NEW KNIGHT

carries 35% extra

The roof, roof bows, side walls, side rails, reinforcements and doors of the new Volume Van are fabricated from high tensile strength stainless steel. The Van is 35′ long, 11′ high and utilizes 94″ of space out of a possible 96″ of legal outside width. Inside length is only 4½″ less than the overall length. The "Shot-weld" process of construction, developed and employed by The Budd Company in producing panels, etc., fuses the entire stainless steel structure into one integral unit.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

OF THE OPEN ROAD

payload in lightweight armor

of STAINLESS STEEL

It's the Fruehauf Trailer Company's new Stainless Steel Volume Van.

Stainless steel trailer construction is not new in itself. Stainless steel trailers have been used for years by both large and small fleet operators for transporting milk, meat, produce and frozen foods. They have found that the corrosion-resistant and sanitary qualities of stainless steel cannot be matched for use in refrigerated trailers.

Stainless steel trailers are also at the top of the list for carriers of salts, acids and other chemicals that attack other metals used in trailer construction.

Stainless steel's exceptionally high strength-to-weight ratio has made it possible to design this completely new trailer with 35% extra payload capacity.

Stainless steel construction permits the use of thinner, lighter sections—without loss of strength, without sacrifice in safety. Yet with long life assured at the lowest ultimate cost.

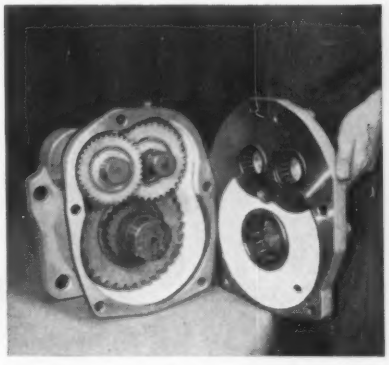
Republic—maker of ENDURO Stainless Steel and world's largest producer of alloy and stainless steels—is proud of its contribution to the new Volume Van. And we offer you the services and knowledge of our metallurgical and engineering departments in helping you use stainless steel to give your product strength without added weight or make it look better and last longer.

Just send us the coupon for more information.

Here are two more Republic products with advantages for equipment builders

NEW USES FOR REPUBLIC NYLOK NUTS are constantly being developed. In this tie-rod clamp assembly they provide positive locking and ease of adjustment. They are ideally suited for mechanical feeding and power wrenching because either end is up. Republic Nylok Nuts lock whether seated or not. Cut maintenance costs, too. They can be backed off for parts inspection or adjustment and then can be re-used.

EXTRA STRENGTH WITHOUT EXCESS WEIGHT is built into parts when you design with Republic Alloy Steels. These fine steels provide an outstanding combination of qualities essential to safety in designing equipment to carry heavier loads at higher speeds. Alloy steels lengthen service life in transmissions, bearing, shafts, axles, etc. Republic metallurgists are available to help you use these steels to the best advantage in your product.



STEEL

and Steel Products

REPUBLIC STEEL CORPORATION
Dept. C-1436
3104 East 45th Street
Cleveland 27, Ohio

Please send more information on:

☐ ENDURO® Stainless Steel Intended Use_____

☐ Nylok* Nuts ☐ Alloy Steels

* U. S. Pat. No. 2,450,694 and pending applications.

Name_____ Title_____

Company_____

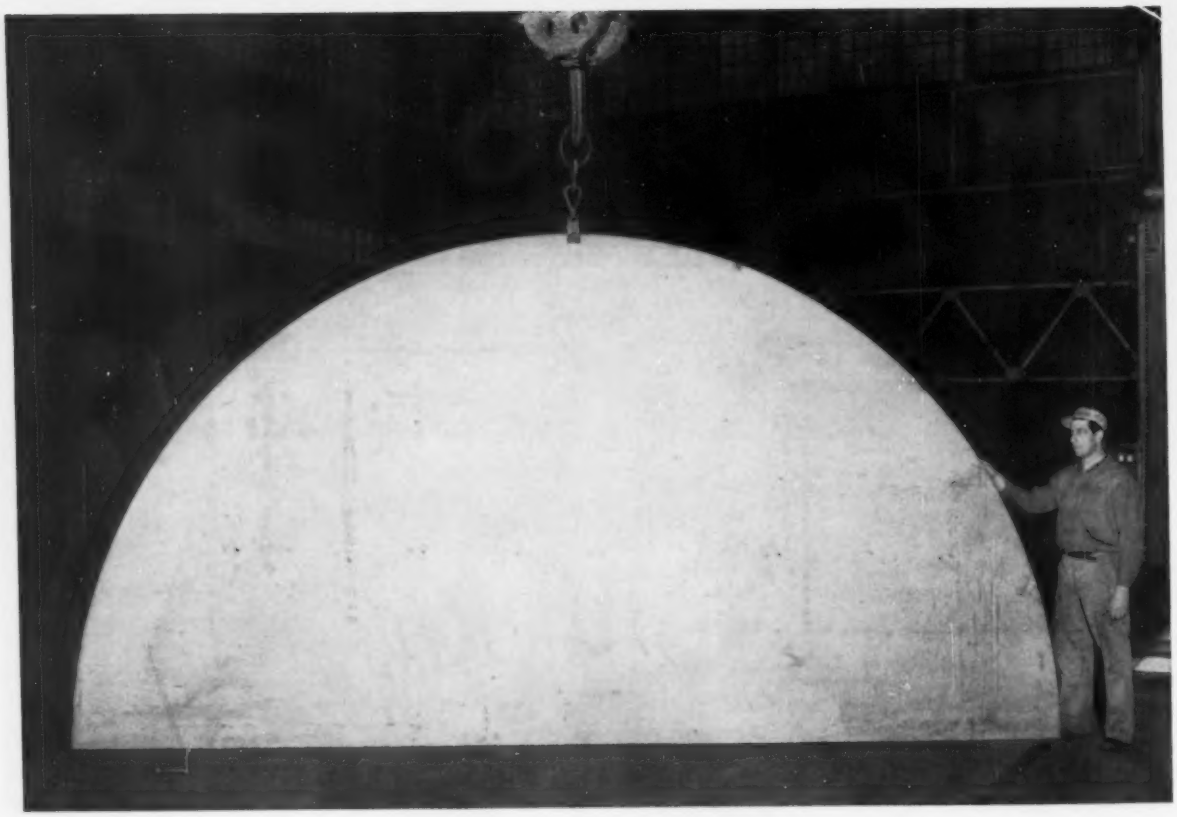
Address_____

City_____ Zone____ State_____

Use this symbol of
outstanding steel
warehouse service–as your
guide to qualified personnel,
diversified stocks, complete
processing, prompt delivery
...your dependable J & L Warehouse

The Department Store of Steel

CHICAGO • CINCINNATI • CLEVELAND • DETROIT • HAMMOND • INDIANAPOLIS • LANCASTER • LOUISVILLE • MEMPHIS • NASHVILLE • NEW ORLEANS • NEW YORK • PITTSBURGH



Carlson specialized service keeps your costs low

Here's how Carlson *specialized service* in stainless plate worked on this job.

The illustration shows one of two segments of a tank head blank. Made of 1″ thick, Type 302 stainless steel, the head blank measures 210″ in diameter and weighs approximately 9000 pounds. Each segment was produced so accurately the customer did not have to "true up" the abrasive cut straight edges before welding the two segments together. This meant the customer had what he wanted, the way he wanted it—produced to his exact requirements.

And here's why you'll want this *specialized* Carlson service.

More than once we've helped a customer do his job easier, quicker and at lower cost by efficient planning and expert use of specialized equipment. This experience can work to your advantage, too. You can buy *exactly* what your specifications call for—and nothing more. This saves freight charges on material you cannot use. It also saves the cost and trouble of handling scrap in your shop. And you can set up a faster production schedule based on receiving what you want, when you want it.

Stainless steel is our *only* business—and we know it! Let us show you how this *specialized service* can help you. Your inquiry will receive prompt attention.

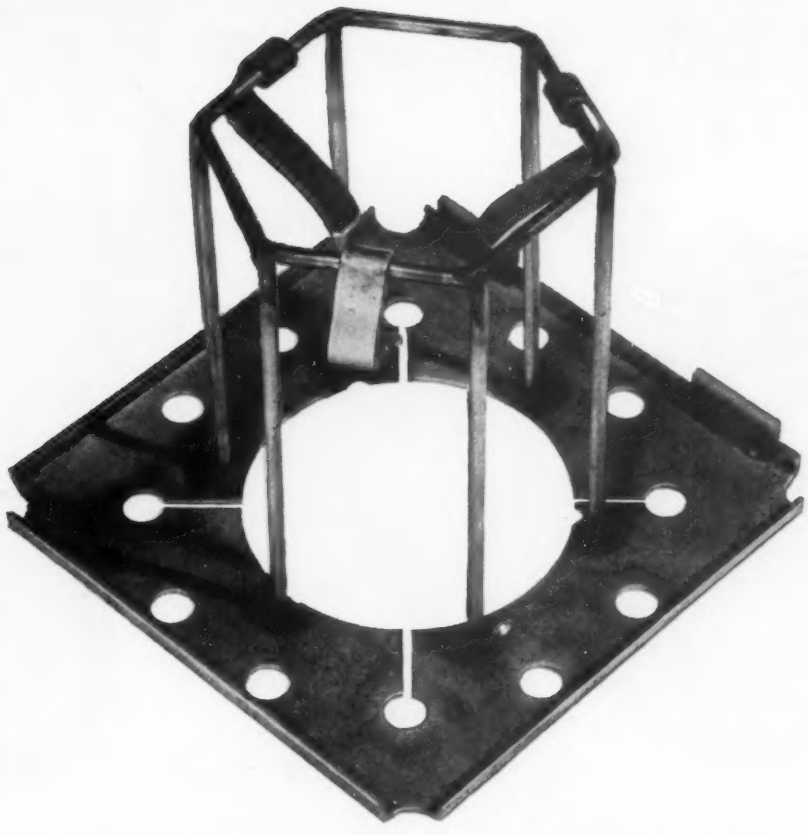
Stainless Steels Exclusively

C. O. CARLSON, INC.

THORNDALE, PENNSYLVANIA

Plates • Plate Products • Forgings • Bars • Sheets (No. 1 Finish)

District Sales Offices in Principal Cities



Still in Use after 1½ Years

of Heating and Quenching

This tray, made of a HAYNES high-temperature alloy, has been subjected to continual heating and cooling for 18 months . . . and it is still in good shape.

In the heat-treating operation, trays and rings are heated to 1550 deg. F for a half hour and then given a rapid oil quench. This repeated exposure to high temperatures and thermal shock caused other trays to twist out of shape in a few days.

The HAYNES alloy used to solve this problem was HASTELLOY alloy C. There are 10 other HAYNES high-temperature alloys—each designed to resist certain severe operating conditions. All of the alloys have remarkable strength at high temperatures, coupled with excellent oxidation resistance and dimensional stability. One of them may be the answer to a production or maintenance problem in your plant.

For information on prices, available forms, and properties of these alloys, write to our general sales office in Kokomo, Indiana or to any of the District Sales Offices listed below.

HAYNES TRADE-MARK ALLOYS

HAYNES STELLITE COMPANY

A Division of Union Carbide and Carbon Corporation

UCC

General Offices and Works, Kokomo, Indiana

Sales Offices

Chicago • Cleveland • Detroit • Houston • Los Angeles • New York • San Francisco • Tulsa

"Haynes" and "Hastelloy" are registered trade-marks of Union Carbide and Carbon Corporation

New Case "400" Tractor, shown here, is setting new standards of tractor capacity, convenience comfort, appearance and over-all performance.

Many parts of YOUNGSTOWN Steel go to make Case's "new from ground up" 400 Tractor

Not often does a farm equipment manufacturer create an entirely new tractor. Such a change is costly—both in time and in tooling costs. But, the J. I. Case Company of Racine, Wisconsin, did it with the Case "400" Tractor.

Another thing that Case did was to make sure that the "400" would be a quality product. That's why parts such as 4th and 8th speed gear seat reinforcement, rear axle shaft, differential shaft, reverse idler gear, front wheel spindle and many others are of Youngstown Steel. These parts utilize 5 different Youngstown Steel products: Hot Rolled Alloy Bars, Hot Rolled Carbon Bars, Hot Rolled Sheets, Cold Rolled Sheets and Standard Black Pipe.

In all Youngstown Steel products, you will find the same dependable uniformity, because Youngstown controls the complete manufacture from start to finish, with emphasis on quality throughout.

Let Youngstown help you with your steel problems. For information and service, get in touch with the local Youngstown distributor—or phone our nearest district sales office.

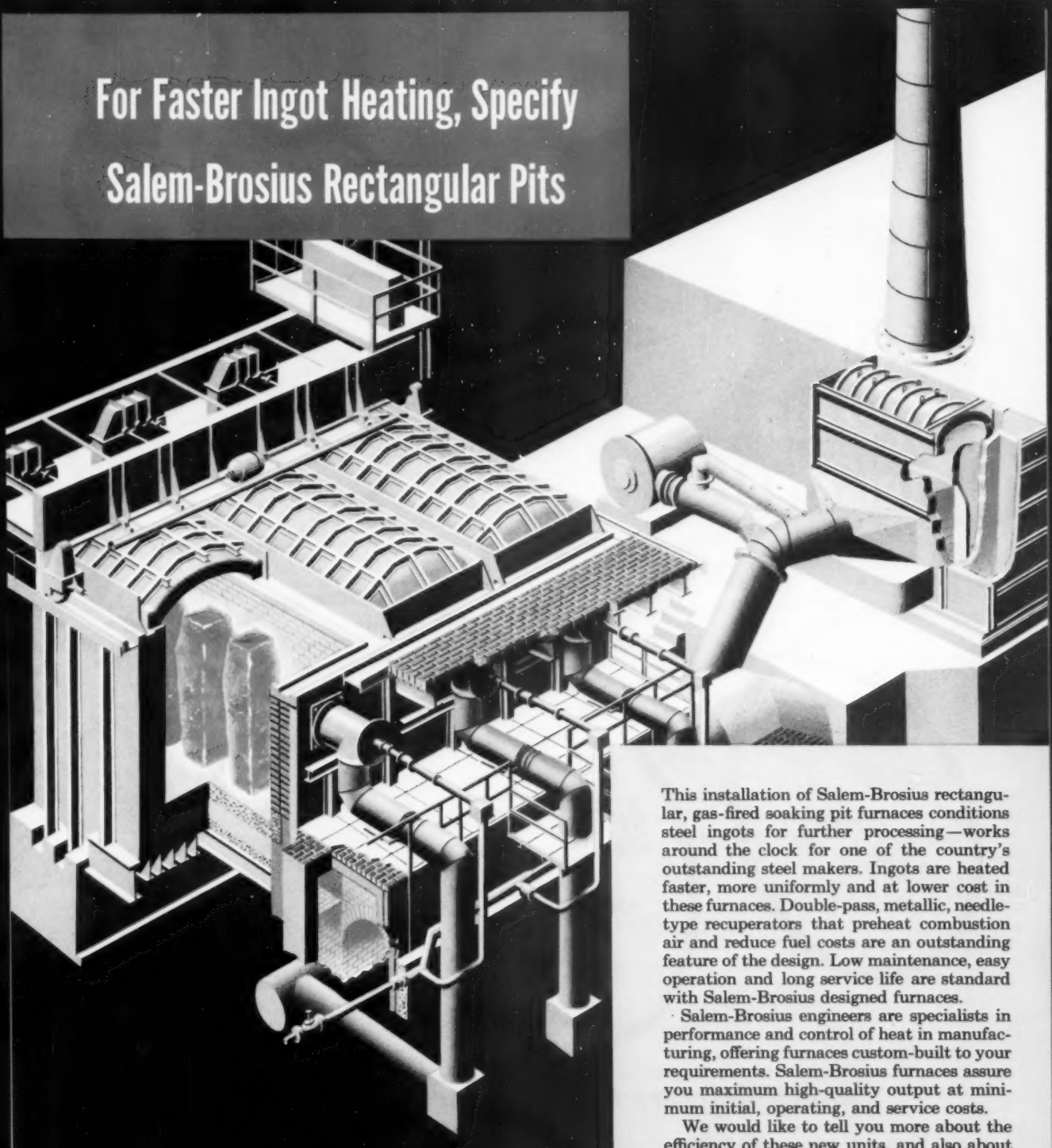
Youngstown

THE YOUNGSTOWN SHEET AND TUBE COMPANY *Manufacturers of Carbon, Alloy and Yoloy Steel*

General Offices Youngstown, Ohio District Sales Offices in Principal Cities.

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - BLACK PLATE - RAILROAD TRACK SPIKES - MINE ROOF BOLTS

For Faster Ingot Heating, Specify Salem-Brosius Rectangular Pits



This installation of Salem-Brosius rectangular, gas-fired soaking pit furnaces conditions steel ingots for further processing—works around the clock for one of the country's outstanding steel makers. Ingots are heated faster, more uniformly and at lower cost in these furnaces. Double-pass, metallic, needle-type recuperators that preheat combustion air and reduce fuel costs are an outstanding feature of the design. Low maintenance, easy operation and long service life are standard with Salem-Brosius designed furnaces.

Salem-Brosius engineers are specialists in performance and control of heat in manufacturing, offering furnaces custom-built to your requirements. Salem-Brosius furnaces assure you maximum high-quality output at minimum initial, operating, and service costs.

We would like to tell you more about the efficiency of these new units, and also about the well-known Salem-Brosius circular soaking pits.

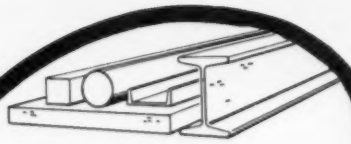
If your modernization or expansion plans call for heating or heat treating furnaces of any kind, write, wire, or phone Salem-Brosius.

SALEM-BROSIUS, INC.

CARNEGIE, PENNSYLVANIA

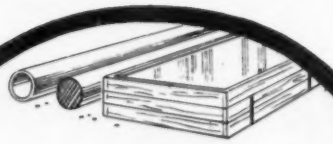
IN CANADA: SALEM ENGINEERING LTD. · 1525 BLOOR STREET WEST, TORONTO 9, ONTARIO

call Ryerson for steel



CARBON STEELS

Hot rolled and cold finished bars; channels, angles, beams, etc.; plates of every kind.



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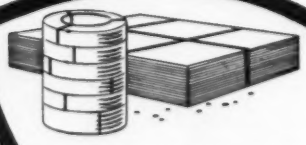
World's largest stock of sheets, plates, bars, pipe, tubing, fittings, etc.



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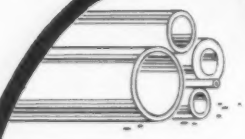
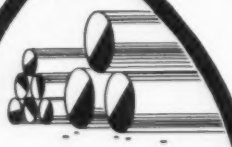


TUBING

Mechanical and pump cylinder tubing, seamless and welded; hydraulic fluid line and boiler tubes; structural tubing, etc.



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NEWSFRONT

Go Easy With Notched Specimens

The variety of tensile specimen sizes in daily use—including the "standards" and the "optionals"—probably bothers no one but the engineering purist. Fortunately, when you're testing unnotched specimens, size doesn't appreciably affect test results. But with notched specimens, beware. Recent tests show that specimen size has a very direct bearing on the final answers —sometimes more than enough to cancel their validity.

GM Dealers Due For New Concessions

In a closed circuit telecast to GM dealers, Harlow H. Curtice is expected to announce new concessions to the organization. Among these will be a reduction in freight costs for dealers in certain areas of the country.

Is Your Home Adequately Wired?

If your home is 20 or more years old, chances are that it is not adequately wired for present day needs. Back in 1938, 25-amp service was still in vogue. Since then, it has been increased to 50 amp, then to 100 amp. With a heavy foreseeable increase in home power consumption, a drive for 200-amp service will be pressed hard this year.

Schools Need More Steel

Federal officials are worried over delays in deliveries of structural steel for school construction. Classroom expansion to relieve crowded conditions during 1956-57 is being handicapped seriously. Requirement for the program is estimated at about 500,000 tons of steel annually. Government wants steel mills to earmark this tonnage for the school program.

From Railroads To Industry To Consumer—

That's the sequence of price hikes if the higher freight rates proposed by the nation's railroads go through. They'll add about $500 million a year to industry's costs. Most industries will simply pass them along, so it's the consumer who'll have to get up the extra cost. The railroads want a flat 7-pct increase straight across the board, but the Interstate Commerce Commission is under strong pressure to tone this bid down somewhat.

Programs Overtax Research Facilities

Private and institutional research groups, which have been depending heavily on industry, are now turning down requests for new programs. Shortage of engineers in industry and lower overhead have been major contributing factors in saturating these institutions with work. Priority on their services will be given to established clients.

Artificial Sand Strengthens Cement

Several steel companies are giving serious consideration to the production of artificial slag sand composed of particles which are almost perfect spherically. From the standpoints of economy and imparting workability and strength to mortar and cement, the product is considered preferable to natural sand and angular crushed material. It contains no foreign or deleterious organic matter.

Aluminum Saves 300 lb In Car Weight

An 800-pct increase in the use of aluminum on Chrysler models over a 30-year period saves as much as 300 lb in car weight. Early cars used only 9 lb for the six pistons whereas present models use from 70.3 lb to 80.5 lb. The number of parts now made of aluminum ranges from 116 to 136.

Automatic Grinder Control

A new approach to electronic gaging not only gives accurate readings, but uses the gaging information as a direct means for machine control. In one installation, 0.075 in. of stock removal is accomplished by grinding in 45 seconds, holding accuracy to within ± 0.0001 in. After rough grinding the crankpin, the operator merely swings the gage into contact with the workpiece and the automatic control takes over. When the part reaches final size, the wheel withdraws.

WEIGH FIRST COSTS

of CMP restricted specification cold rolled strip steel

True costs of cold rolled strip steel are oftentimes clouded by unfamiliarity of the full potential with a specially tailored product such as CMP processes.

Typical of the reductions in overall manufacturing costs that can often be recorded with the use of CMP restricted specification strip, is the elimination of manual costs involved in the tear-down and re-assembly of components rejected for malfunctioning due to steel dimensional variations. Where precision fitting of components is essential to satisfactory equipment operation, the extra steel cost for close gauge accuracy is more than offset by greater parts production per machine hour and reduction or elimination of rejects at final assembly. Add to this the lower end product cost resulting from longer tool life, fewer coil changes on production equipment and other labor cost items.

The conclusion often is that it pays to buy a premium specification product to lower the cost of an end product employing cold rolled carbon, alloy or stainless strip steel.

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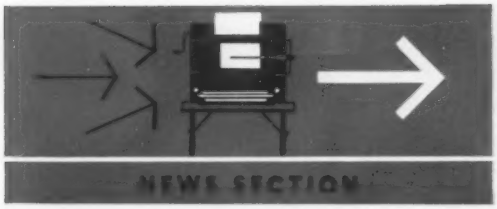


TOOLING: Auto Changes Crowd Shops

Tool and die shops boom with new auto model changes . . . Detroit shops stir up industry with recruiting drive to solve labor shortage problem . . . Automakers push for early delivery—By *T. M. Rohan.*

◆ AUTOMOTIVE TOOL and die shops in Detroit—loaded for the year and beating the bushes for extra workers—stirred up a hornet's nest in Cleveland last week.

With customers being turned down for lack of personnel, a recruiting program was started in Cleveland.

The Ohio employment service insisted local employers get first crack at any volunteers who showed up since interviews were in its office. Despite the excitement, less than half a dozen prospects replied to the call.

Early Introduction

The scramble for workers in Cleveland spotlighted the tightest season in the tool and die industry since World War II. Added excitement is coming from automakers champing at the bit to come out with 1957 models. Other highlights:

Auto plants have set delivery time for major automotive dies July 15, indicating early model introductions possibly as early as mid-August if sale of 56s lags this spring and summer. This is not likely, however, because there is little to gain from pre-Labor Day introduction.

Tool and die shop delivery dates are out to 16 weeks in Cleveland on medium and large size dies compared to normal 6-8 week delivery. Detroit is booked solid until after this year's automotive tooling program. Most other Midwest shops have six months of solid business in prospect.

Industry officials expect this year's business to top the 1953 peak of $750 million sales.

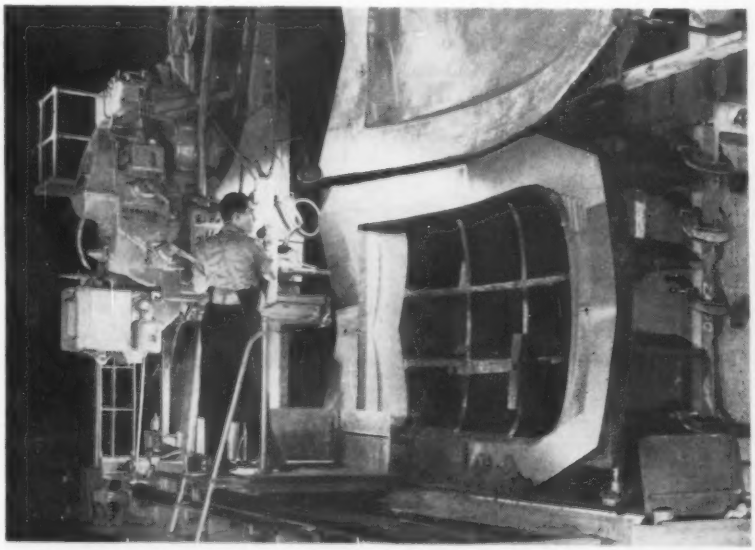
Biggest technical advance is development of multi-stage dies, some with built-in transfer mechanisms. These can operate continuously using strip steel and are tailored for automation.

Sidelines

Auto tooling volume slipped behind appliances last year but is making big comeback now.

Many shops are developing stamping sidelines to more fully utilize large presses now necessary for "proving" dies before shipment.

Tool and die shops in Ohio, Indiana, Illinois and Wisconsin are being swamped with automotive business on top of normal orders. Acme Aluminum Alloys in Dayton, O., last month quadrupled its backlog of tool and die orders after an open house for its expanded and modernized shop. M. S. Putterbaugh, tool division manager, said Acme's new Kellering machine is booked around the clock into July on large dies. The shop is on a 58 hour work week and some Sunday work is being contemplated. The firm recently completed a major conversion from aluminum foundry work and is now one of the largest specialty machine shops in the Midwest. New larger machines have permitted Acme to tackle larger automotive diemaking for the first time and this demand—on a rush basis—is coming on top of heavy volume in appliances, farm implements and miscellane-



TOOL and die shops with automotive contracts, like this body top project on a Kellering machine, are operating at full capacity with all the work they can handle. National Tool and Die Manufacturers Assn. photo.

ous. Auto dies this year are expected to comprise 50 pct of total tool and die volume, according to Mr. Putterbaugh.

Aircraft Business

Barth Corp. of Cleveland has its biggest backlog in history and is getting heavy volume from aircraft and guided missile work on top of automotive and appliance business.

Another Cleveland shop expects to double 1955 business. "Last year we had toolmakers sitting around waiting for a job to come in, now we can see a solid six months business ahead of us. We'll probably double 1955 and finish 15 to 20 pct over our best recent year of 1953," Richard Voigts, Bunell Machine and Tool Co., said. In addition, heavy research is going on in developing special tooling and jigs for automation.

Labor Shortage

Detroit automakers have no crystal ball to tell if auto sales will spurt this spring. Bad weekend weather, especially in the East, has not helped sales and early spring weather is bound to. If the 56's don't pick up saleswise, automakers are tooling up to come out with 57's early in the fall.

Record Volume

Ford will probably be the leader among the Big 3 but General Motors may get a jump on Ford with one car, probably Pontiac or Buick. Major GM style changes will be in larger cars—Cadillac, Oldsmobile, Buick Roadmaster and Super.

Overall tool and die shop volume this year will probably top the 1953 peak of $750 million, according to George S. Eaton, National Tool and Die Manufacturers Assn. executive secretary. Incoming orders in December, 1955, last month for which figures are available, were highest since September, 1953. Most of the push this year is coming from Detroit automakers who want tooling in earlier than usual, Mr. Eaton said.

HIGH volume of activity is putting the pressure on the supply of skilled labor. Men qualified to handle precision work, such as this punching pad of brake arm die, are competed for by many of the major industries.

"The growing volume of incoming orders and rising backlog of unfilled orders augurs well for a continued high level of operations in early 1956 for the special tool and die industry of 2500 small contract shops," Mr. Eaton said. "This strong demand will continue at least through the first half as automobile companies, appliance and electronic manufacturers and other companies fabricating metals and plastics strive for sales through the appeal of new models."

Defense Orders

While most tool and die orders come from private business, aircraft and guided missiles are increasing in importance. A jet engine requires 20,000 specially designed and manufactured tools, jigs, dies and fixtures before production while World War II engines required half that number.

The growing complexity and precision of tools and dies is also making a good market for new machine tools. Many toolmakers are finding it difficult to hold tolerances of a ten-thousandth on equipment that was entirely satisfactory when a thousandth was close enough.

However, the problem of increased time required on precision work is less critical than the rapidly developing shortage of skilled labor. Experienced tool and die mechanics and craftsmen are being competed for in a situation that looks to get worse.

List Critical Skills

Better distribution of skilled manpower between the armed forces and defense-supporting industry is the aim of a newly-prepared U. S. Labor Dept. list of critical occupations for screening the military ready reserve.

Appearing on the list are 81 skilled occupations, many of them in metalworking fields, which will be essential to war production and to fulfillment of minimum civilian needs in an all-out emergency. This roster is to help guide transfer to the standby reserve of specially-trained men not needed in the ready reserve.

Information on the full list may be obtained by industry from J. Dewey Coates, secretary of the Interagency Advisory Committee on Essential Activities and Critical Occupations, 5219 Dept. of Labor Bldg., Washington 25, D. C.

TV: Color Picture Clear and Bright

This year will see volume sales of color sets . . . But it's only the beginning . . . By 1960 color will account for 32 pct of TV sales . . . Whole electronics industry scores gains—By *K. W. Bennett.*

◆ COLOR TV is moving up fast, figures to give added steam to an already booming electronics industry.

This year, color sets will account for only about 250,000 out of a total 7.5 million receivers sold. But with saturation of the black and white receiver market about 74 pct complete, TV makers are talking volume production and marketing of the color units.

Market forecasts suggest that 9.6 million TV sets will be sold in 1960 and that about 32 pct will be color. In 1965, color sets will account for 72 pct of a total 11.6 million units sold.

Take More Steel

Builders figure high prices won't hold back buyers once they've seen color TV in action. With several color TV shows being transmitted weekly, set manufacturers feel their major problem now is to lure the public into watching color TV. From that point on, the customer's "impulse to buy" will do the rest.

To steel component suppliers, it's worth noting that a color receiver takes about twice the total of steel required for a black and white set. Heavier magnets, larger chassis, steel straps: the color sets are bigger and more complicated in every way.

It's worth noting also that home television is a relatively small part of the whole electronics industry. With radio included, the home market accounts for only about one-eighth of the $10.8 billion estimated for all electronic equipment sales. Producers forecast 10 to 20 pct gains in all categories during 1956.

The industry's number one customer, and still growing, is Uncle Sam. Second largest customer since the beginning of 1955 is private industry. International Business Machines, for instance, passed the $500 million mark in 1955 and sales of electronic computers to industrial purchases represented an important part of this total.

Buy Hi Fi

This does not mean the home market is off. Radio sales, which dipped in 1952 (10.9 million sets built), rose to a near-record 14 million units last year, and are expected to climb another 20 pct this year. Car radios figured prominently in last year's showing, but in the home, too, people are rediscovering the radio.

In the growing high fidelity record player field, one producer brought out a Cadillac-styled model priced at $1600 and aimed at a strictly prestige market. Model turned out to be a Buick, was sold out of stock three times, is now in regular production.

Push Production

All of which adds up to a growing market for light press equipment, materials handling equipment, job stampings, soldering and welding equipment, forming dies, fasteners, sheet steel and such trail-off items as transistors and capacitors. Whether producers decide to make their own stampings or not, they'll increase procurement in 1956. One producer will up his purchases of stamped steel radio chassis by 10 pct; of stamped aluminum chassis by 25 pct.

Coupled with more components buying is an advancing wave of capital investment. At least three major new plants have come into production in the last year. One big producer will enlarge his plant by another 200,000 sq ft this year.

At the same time, as one vice president for purchasing put it, "We're hip deep in automation out here and will be for some time to come. Television and radio are big markets but competitive . . ."

Automatic lines producing printed circuits have captured most national interest, but automatic assembly extends to production of steel cabinets, portions of television and radio tubes.

Electronics Picture Pleases

	Sales Last Year	Sales Outlook
Overall	$10.8 billion	10-20 pct '56 increase
Radio	14 million sets	20 pct '56 increase
Television		
All sets	7.6 million	9.6 million sets in 1960
Color sets		32 pct of total in 1960

SPECIAL REPORT

Is "Business Cycle" Old Hat?

New "Defense Cycle" theory advanced by economist Eliot Janeway . . . Predicts continued high rate of business through 1956 . . . Inflated metals market may be result.

◆ IN THE LAST ten years I have brought distress to my friends and comfort to my critics by developing a consistent series of unorthodox forecasting premises and conclusions. My lonely and stormy journey through economic heresy has often reminded me of how, years ago, a mutual friend sadly described the ups and downs in political popularity of the late Senator Robert A. Taft. "When Bob wanders on to the popular side of any argument," this philosophic observer complained, "it's a very temporary accident." Any coincidence between my expectations for business and those of most businessmen seems to be just about as accidental and as temporary.

"...I believe that the conventional business way of calculating business trends is wrong, because hopelessly obsolescent."

Right now, most businessmen expect some kind of a downturn. That is, they expect 1956 to fall below 1955. As of the middle of February, it is. Moreover, most businessmen expect 1956 to end at a lower level than that at which it has begun. But here I find myself again obliged to take my stand as an economic heretic. I expect business to finish 1956 at a much higher level—even if Ike doesn't run, or (here, unfortunately my heresies pyramid) even if he runs and loses —as I believe he could.

Particularizing, the recent boom has sent copper from a real price of 30¢ a pound to an official price of 46¢ but a real bucket-shop level of 50¢ plus. Simultaneously, steel scrap has gone from under $30 a ton to over $50. Most businessmen are waiting for both prices to break and stay down. If they should, I would be the first to admit error—in fact, it would take a major downtrend in activity to break copper and (though it is more volatile) scrap. But I expect copper to stay up and go higher, and I expect the scrap inflation to survive the spring market weakness clearly ahead for it. A steel strike would, of course, crack the scrap market, but only for the duration of the strike.

Generalizing, what most businessmen expect is understandably tinged with what they want; namely, a level of activity somewhat lower than at present, but a level of cost (and a corresponding need for money) very much lower. Instead, what I think is in store for them is a level of activity somewhat higher, and a level of cost (and a corresponding need for money) very much higher. If I am right, as I greatly fear I am going to be, 1956 business activity will improve sufficiently after Labor Day to make business worse: worse because costs resulting from inflation will again be rising faster —very much faster!—than revenues resulting from recovery.

Eliot Janeway

Economic "heresy" has paid many dividends to Mr. Janeway, but a harvest of frowns from more orthodox economists.

Who Is This Man Janeway?

▪ Eliot Janeway is a self-styled fugitive from generally accepted methods of forecasting business trends. For instance, his "Defense Cycle" theory versus the "Business Cycle" system that economists have been leaning on for years.

▪ Right now, he's riding the crest of the wave. In his Janeway Services publications, he predicted:

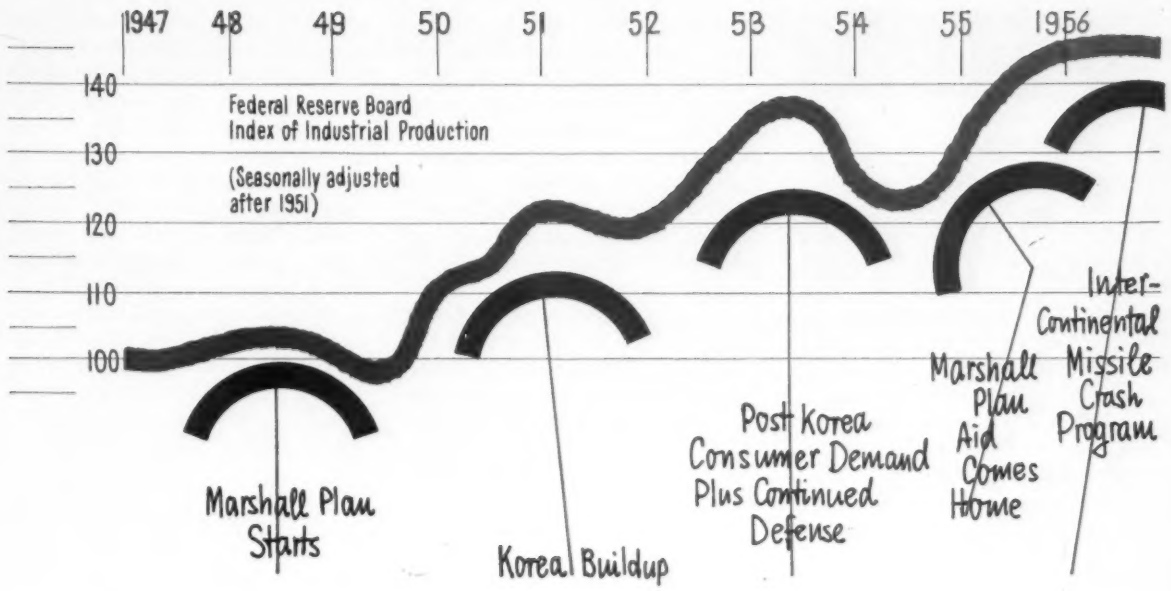
▪ November, 1953 — If copper price did not break 30¢ per lb (which it didn't), the post-Korean adjustment would be short and mild.

▪ October, 1954 — The steel shortage of 1955-56.

▪ July, 1955 — Copper price would rise to present 46-53¢ level and would hold there.

▪ June, 1955 — Steel scrap prices would move up to record-breaking peaks of recent months.

▪ As of now, Mr. Janeway is disagreeing (see story) with economists who look for a downturn in 1956. He expects business to wind up the year at much higher level than when it began. —a minority opinion.



DEFENSE CYCLE

Chart shows how Defense Cycle theory could be projected against production index curve.

These are dramatic differences of expectation. I don't differ with the majority for the sake of differing. Yet I am not surprised at how consistently my view differs from that of most businessmen. Nor is it surprising to me that most businessmen have been on the losing side of the argument about this "surprise" boom of ours. For my approach to the forecasting problem is different from theirs. My way of counting is different. I believe that the conventional business way of calculating business trends is wrong, because it is hopelessly obsolescent.

To put the issue squarely, most businessmen still believe in the Business Cycle. I don't. These are fighting words; and to those who remember the "New Era" predictions of the late Nineteen-Twenties, they are frightening words. Automatically, as a reflex action, most businessmen assume that any nonbeliever in the Business Cycle must be a callow, shallow, sloganizer of "On and on, and up and up"—to a new 1929. But I disbelieve as thoroughly in "New Era" illusions of nothing-but-prosperity-ahead as I disbelieve in outworn faith in Business Cycle forecasting. In fact, it is my basic working premise that business trends do not result primarily from business causes.

So much for what I do not believe — that is, for the mistakes I have been spared from making about the trend. Now for what I do believe—that is, now for such successes as I have had in keeping pace with the trend. The simplest way to put the main difference between my view and that of those who still believe that the business trend is made within the economy is just this: I believe that the business trend is indeed subject to a cycle, but not to the Business Cycle as in the past—instead to what, for lack of a better term, I find myself calling the Defense Cycle.

"... Everyone now concedes that Business Cycle calculations failed to describe, much less to forecast, the 1953-56 trend."

Now, I lay no claim to special insight. Anyone who had calculated the history of the past few years by the Defense Cycle instead of the Business Cycle would have been as right as I was and—because I don't count very well — probably righter. What I have had on my side of the argument against the *economic* forecasters has not been prophetic ability nor, certainly, special information, but simply a relevant and up-to-date way of calculating. I have calculated by the Defense Cycle. This has made me seem hopelessly out of step with those calculating by the Business Cycle. But from the vantage point of Defense Cycle calculation, calculations based on the Business Cycle seem hopelessly out of step with mid-century reality.

Everyone now concedes that Business Cycle calculations failed to describe, much less to forecast, the 1953-56 trend. Let's reconstruct the 1953-56 trend in terms of Defense Cycle calculation. I believe that this exercise in hindsight will serve to equip us with the foresight needed to anticipate and prepare for the 1956-57 trend.

Many people are confused by the use of the term "Defense Cycle" in the absence of shooting. First, therefore, a word of caution about the workings of the Defense Cycle under the conditions created by the kind of multi-front war Soviet imperialism is waging against us. It

is a multi-front war as to geography and also as to weapons—military, political, economic, cultural. This is a war that does not stop when shooting stops. It didn't in 1945 and it didn't in 1953. But the business mind, which responds instinctively to the ups and downs of the Business Cycle, assumed in 1953 that Defense would end when shooting was suspended in Korea, and that the Business Cycle would then take over again.

As everyone remembers, in 1953 business expected the beginnings of a recession of 1920 proportions. Instead, though Defense was not sustained, it was not stopped either. The role it played in the economy was not planned, but it was effective—it put a floor under business activity that stabilized the economy on the down side against the shock of Secretary Humphrey's first, badly overdone, hard money experiment. At the same time as it stabilized activity, however, Defense on its post-Korean scale continued to inject inflation into the economy. Certainly, in the absence of shooting since 1953, Defense has nevertheless injected more inflation into the economy than Secretary Humphrey's two experiments with hard money have siphoned out of it. Just as the economic trend is not made within the economy under Defense Cycle conditions, so the fiscal trend is not made by the zigzagging and sloganizing of fiscal policy, but by the arithmetic of Defense reality.

It was a question of fact, not theory, which in 1953 was at the core of my disagreement with the Business Cycle bears, as they then were: was Defense going to be sustained or stopped? Admittedly, it was not going to be sustained at Korean War levels. But on the assumption that "no shooting" meant "peace," the Business Cycle bears assumed that Defense would be stopped. In this, they were wrong. The impact of Defense on worldwide business activity was sufficient to supersede the workings of the Business Cycle.

Coming into 1954, the issue was again one of fact: whether once the Defense Cycle had stabilized the business trend on the down side, an uptrend could start without any increased indirect Defense spending from Washington. What happened, to begin with, was that the mere continuation of Defense spending in 1954 was enough to show that 1953's inventory liquidation had been badly overdone. With this discovery came forced inventory re-accumulation.

Simultaneously, the upturn gained momentum from a subsidiary effect of the Defense Cycle; namely, from a spectacular surge, since sustained, of European demand for mineral and metal products. Here, from well outside the time-cycle of 1953-54 business activity, came an invasion from the politics of 1948, the year in which the Cold War had produced the Marshall Plan. Six years later, capital investment was producing European demand for metallics on a new scale which only imports could meet.

"... No inside information, and certainly no exposure to economic soothsaying, is needed to see that the Defense Cycle is about to send business activity still higher, and for a still longer period ahead."

Specifically, the struggle to Americanize Europe's living standards on pain of permitting Europe to be Sovietized is just as real a battlefield as Dien Bien Phu was, or the Middle East threatens to become; and it demonstrates Defense Cycle activity as clearly and as directly as the Defense Budget itself. The 1954-55 recovery, having been guaranteed a floor by the Defense Budget, was spurred into its upward spiral by this non-cyclical stimulus of European demand. This helps explain why the 1955 boom was able to soar without benefit of any direct new Defense demand from Washington. It was the Defense Cycle that caused it, but in its offshore phase of generating metallic requirements for Europe's new level of consumption.

What of the future? Business Cycle theory, of course, has a ready answer, no longer trustworthy by my method of accounting, but plausible. By Business Cycle standards, activity has been up for a long time; demand has now caught up; and it is now time

Janeway And Labor

■ "One of the fashionable illusions of the last 20 years is the opinion that Labor is now as well-informed about the economy as Business itself. It would be more precise to say that Labor now has enough economists on tap to be as poorly oriented toward the trend as Business.

■ "Certainly, Labor was in such good company in its disorientation from the trend that it missed the 1954 upturn, and failed to trust the 1955 upsurge. Consequently, 1956 is due to see another Operation Catch-up in the labor market, and in spite of the belief Labor shares with Business that 1956 is at last producing a downturn.

■ "After all, the Labor argument runs, 1954 was a poor year which nevertheless supported a wage spiral, so why shouldn't 1956? It will, not least because the Defense Cycle is on the verge of turning it into too good a year for cost comfort.

for activity to come down. Against this theory, Defense Cycle calculation replies that it has been a long time, too, since direct Defense spending has increased. When the Korean shooting was suspended in 1953, Defense was not stopped but it was slowed down. It was slowed down, however, on an assumption normal to the Defense Cycle; namely, that it could be speeded up again, and would be when need arose.

The need has now arisen. Indeed, as usual, we have been late in sounding the alarm. It is now officially admitted that the new advantage Russia has gained in the missiles race puts us in need all over again of a new "crash-program."

At any rate, Operation Catch-up is about to begin. It will be expensive. The need for it has been a long while coming to a head. By the same token, the lead-time involved in modern military technology is so great that 1956's impending "crash-program" is fated to span a long period. Indeed, today's appropriations for modern weapons cannot possibly produce operational results this side of the 1960's. This is too bad from the standpoint of national strength. It is too good from the standpoint of business activity. It certainly reduces to irrelevance the Business Cycle theory that activity must now fall because it has been so high for so long. Against this conventional assumption, the new Defense emergency in the headlines reminds us that the Defense Cycle must now be expected to reactivate because it has been dormant for so long.

"... In 1956, commodity price inflation will not stop, but I expect labor market inflation to pass it again."

Two new and distinctive characteristics of present day Defense explain why its impact on the economy is about to provide irresistable inflationary impetus. The first is that, while we are caught short—as we always have been—we are nevertheless starting up our new Defense effort from a high level of Defense spending—as we never have before. In 1914-16, in 1940, and in 1950, "crash" Defense spending began at low price levels, and with plenty of spare capacity in the economy and, particularly, in the skilled sections of the labor force.

Today, by contrast, Defense is starting amidst inflation, not deflation; and, ominously, it is an inflation whose pace was set in the labor market until 1955, when commodity price inflation passed wage inflation. In 1956, commodity price inflation will not stop, but I expect labor market inflation to pass it again. Note that the Number One requirement of the new Defense program will be for precisely the skilled manpower which is already in just as short supply as nickel.

The second novel characteristic of present day Defense is that it will buy a great deal more in the way of overall inflation than it will create demand for bulk materials or assembly-line labor time: this, again, thanks to the tremendous but largely ignored fiscal impact of Defense. Defense spending can, and soon will, rise substantially without creating any direct Defense demand for foundry labor or for standard procurement materials such as textiles for tinting or steel for vehicles. Defense billions nowadays not only create mass purchasing power, but leave most facilities, materials and manpower free to absorb it commercially.

Summarizing, even if 1956 produces a recurrence of localized shooting—which, alas, seems likely—a speed-up of the Defense Cycle is not likely to interfere with business activity at the rate of 7½ to 8 million cars a year and 1.3 million to 1.5 million housing starts a year. But even without localized shooting, accelerated Defense inflation can be expected to pump enough purchasing power into the system to guarantee sustained activity at this rate—and at higher cost levels.

Not that my expectations of a sharp upturn in second half business activity and a still sharper upturn in the cost spiral, hinge on any specific Washington "news"—any more than my expectations did in 1954. On the contrary, easy money is coming back as fast as it did early in 1954 in advance of direct Defense stimulus, and, already, it is bringing back better atmospheric conditions for the consumer debt industries—automotive, appliance, and residential building (all three about to benefit substantially from the wage increases coming this summer). In 1954, the return to easy money turned the trend upward while Defense was stagnant and as offshore demand was merely beginning to hit our commodity markets: while, be it noted, the economy had capacity to spare and costs were lower. Today, by contrast, easier money is beginning to spiral the trend up again from present levels simultaneously with Defense reactivation and with sharp step-ups in offshore demand.

"... Labor now has enough economists on tap to be as poorly oriented towards the trend as Business."

Defense reactivation plus offshore demand will pump enough new inflation into the situation to offset as austere a monetary policy as Mr. Humphrey would be likely to launch between elections and at a higher level of farm prices. Instead, money is easing faster exactly as the Defense Cycle is lessening the dependence of activity upon it. All of which is to repeat with emphasis that my bullishness for activity, and my bearishness for hopes of avoiding more Defense inflation, are both independent of any guesswork about Washington "news."

FIGHTING WORDS?

Mr. Janeway's gospel of the "Defense Cycle" may be heresy to orthodox believers in the "Business Cycle," professional and amateur alike. But no one can argue that his thesis is, to say the least, provocative and stimulating. If you disagree, let us know. We will be happy to consider publishing your comeback—The Editors.

MANAGEMENT

EMBEZZLEMENT: Annual "Take" Rises

Metalworking firms among victims of theft and book-juggling schemes . . . Losses reach half-billion dollar mark . . . Tight employment a factor in rise . . . Tips to avoid losses—By *R. D. Raddant.*

◆ EXECUTIVES OF a large metal fabricating company were surprised and disappointed recently when collusion of a trusted billing clerk with a scrap dealer was uncovered.

Surprise turned to shock, and disappointment to outrage when the history of three years of short weighting rail cars was compiled and actual losses to the firm totaled about $116,000.

Cases like this are far from infrequent. In fact, the manner in which the clerk short weighted the rail cars by 10,000 lb, then split the illegal profit with the scrap dealer, is described as "the traditional method."

It illustrates the increasingly high bill that business is paying each year for dishonesty and also the hidden danger of embezzlement—the fact that it can go undetected for years until losses reach the point where they can actually ruin a large company.

Insurance Losses Rise

Like another Pennsylvania metalworking firm where in a period of five years of employment the comptroller embezzled over $100,000 by drawing checks to himself or fictitious persons, then cancealed the losses by juggling the books. The firm is bankrupt.

B. H. Mercer, president of the Fidelity & Deposit Co. of Maryland, nation's largest insurer against dishonesty, estimates that value of money, merchandise, and materials stolen by employees reached $500 million last year.

Honesty insurance losses paid by capital stock insurance companies have jumped from $5,616,431 in 1944 to $16,456,877 in 1954.

(This rise of almost 400 pct is offset to the extent that more blanket policies are written today than 10 years ago. With more policies of broader coverage, payments are bound to increase.)

What's Behind Rise?

Experts in the field believe the big factor behind the increase in loss through dishonesty is the tight employment situation that has characterized the past decade.

This has resulted in less screening of employees, less demand and attention to references and background investigation.

"The ability of employees to steal is not due generally to lack of internal control, but to failure to maintain the system. Failure of one link in the chain of controls can result in theft," a spokesman for the Fidelity & Deposit Co. points out.

Sociologists and realistic investigators alike agree that embezzlement from employers is not considered a professional crime by police standards.

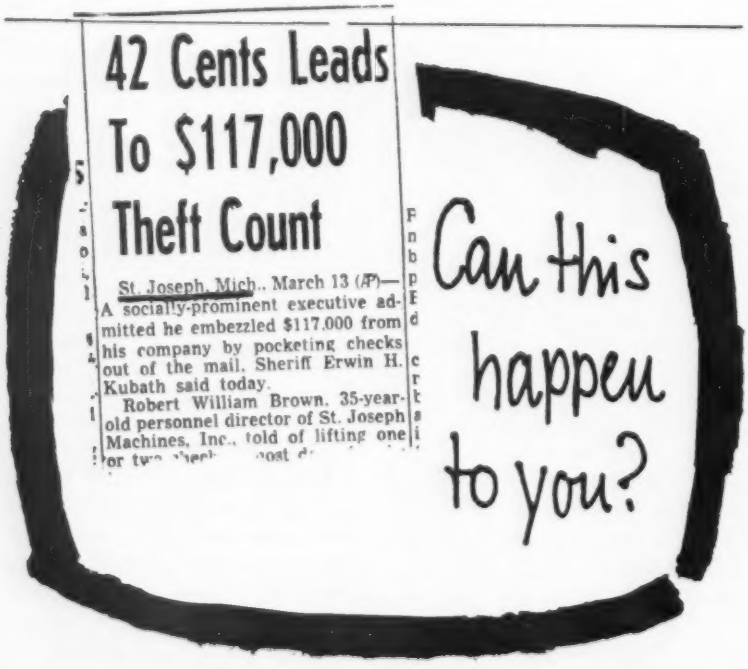
Three Basic Fields

Mr. Mercer says that one of the peculiarities of embezzlement is that it is "an amateur's crime." Almost always, the embezzler's previous record is spotless, his reputation excellent.

One principal reason for the crime is that the embezzler becomes involved in a financial problem that he can not share with others, takes to stealing as the only recourse. Frequently it is accompanies by rationalization.

There are three basic fields of possible embezzlement: cash receipts, cash disbursements, and through disposal of merchandise or materials.

Probably the most frequent in-


42 Cents Leads To $117,000 Theft Count
St. Joseph, Mich., March 13 (AP)—A socially-prominent executive admitted he embezzled $117,000 from his company by pocketing checks out of the mail, Sheriff Erwin H. Kubath said today.
Robert William Brown, 35-year-old personnel director of St. Joseph Machines, Inc., told of lifting one
Can this happen to you?

stance of employee theft is through intercepting of cash recepts before they get on the company ledger. Cash registers, numbered sales tickets, and autographic registers are routine methods of safeguarding over-the-counter receipts.

Cash received by mail is a different matter. Mail should be opened by someone other than the cashier or accounts receivable bookkeeper. A list of all mail receipts should be prepared by the person opening the mail, and the list compared regularly with the cash receipts book.

Things To Do

A new Fidelity & Deposit checklist of receipts safeguards asks:

Are deposits made of each day's receipts intact and is responsibility fixed until deposit is received by the bank?

Are all shortages and overages promptly recorded and reported to proper authority?

Does someone other than cashier directly receive bank debit advices?

Are duties of cashier and bookkeeper performed by different persons?

Is cash physically safeguarded?

Recently the head of an eastern steel warehouse became concerned over falling profits, but was unable to put his finger on the reason. But on a Sunday drive with his family, he observed his own truck deliver steel to a regular customer. Investigation showed that about 15 of the firm's regular customers were "Sunday" customers of the driver. Losses reached $20,000 in a short period.

In five days, two employees of a New York plating company took $3000 in copper anodes; simply took them out in their car. At another steel fabricating company, $5000 to $6000 in acetylene torches and related equipment were just thrown over the fence.

Metalworking Slant

In recent years, dishonesty losses have risen most sharply in commodities. Here again it must be remembered that number of policies and extent of coverage have been expanded.

How To Cut Merchandise Losses

- **Make sure all purchases are authorized by responsible party.**
- **Approve invoices only on evidence that merchandise is received.**
- **Be sure purchases and invoices are checked for quantity, quality, prices, terms, shipping charges, additions and dates.**
- **Proof of receipt of merchandise should be in written form and numbered.**
- **Are all return sales replaced in stock and credits approved?**
- **Make unannounced counts of inventories by employees other than stockkeepers and those keeping records.**

Specialists point out that metalworking and fabricating firms have all the hazards incident to other types of business—plus the special risk of scrap losses. Scrap is difficult to control, hard to grade and record precisely. And it is generally handled carelessly as waste material without the care given a valuable commodity.

Like the yardmaster of a Midwest roller bearing plant who colluded with the trash collector by sending out $12,000 in bronze, aluminum, and brass scrap by simply filling drums with the turnings, and covering them with trash.

In a brass screw manufacturing shop, three employees placed brass rod ends, rejects, and other scrap in drums, covered them with steel turnings as a camouflage. Altogether, 98,826 lb of scrap were disposed of, resulting in a loss of $18,795.72.

Embezzlement of money is more complex, can be more difficult to uncover. Here are some of the more common methods, as listed by Lester A. Pratt, accountant specialist in fraud investigations:

Issuing checks in payments of bills of fictitious suppliers and cashing them through a dummy, or by faked endorsements.

Invoicing goods below established prices and getting cash kickbacks.

Raising amounts of checks, invoices or vouchers after approval.

Issuing and cashing checks for returned purchases not returned.

Forging checks and destroying them when returned by the bank, then concealing the transactions, or by raising amounts of legitimate checks.

Many embezzlements occur through the use or misuse of checks. You can cut your firm's embezzlement chances by making sure that:

All checks are on safety paper, serially pre-numbered and all numbers are accounted for (including voided checks).

All checks are written in permanent ink or by machine.

At time of signing, checks are completed except for signatures and accompanied by supporting documents on which the check number and payment date appear in ink.

Totals of cash disbursements journals are periodically verified and compared to general books by persons other than cashier, accounts receivable bookkeeper, or person keeping general books.

Payrolls are paid by check.

Pay rates, time worked, and calculations are reviewed independently by unannounced examinations.

Actual distribution of pay to employees is occasionally supervised with special investigation of unclaimed wages.

MANUFACTURING

BUILT-IN-TUBES: Moving a Hot Market

Heat exchanging applications are a ready market for sheet and strip with tubing patterns . . . Three companies compete in untapped field . . . May crash radiator market . . . Construction possibilities—By G. G. Carr.

◆ IT REALLY OUGHT to have a name—the fast-growing business of putting inflatable tubing patterns within sheet and strip, that is. Each of the three producers now in the field has a trade name for its product, but a generic term is warranted by the market.

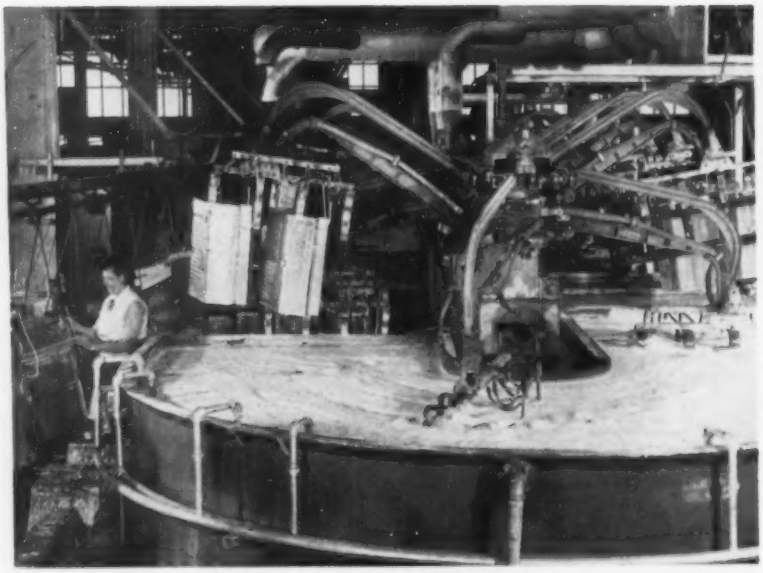
The sales race should be something to watch. Olin-Mathieson Chemical Corp.'s Roll-Bond and Reynolds Metals Co.'s Tubed Sheet are very similar, at least as far as the end product is concerned, while Revere Copper & Brass Inc.'s Tube-In-Strip differs significantly in some major aspects of production and finished product.

Still Learning

But nobody will get hurt very badly. The market is too big. Just how big is undetermined yet. O-M introduced its Roll-Bond in the fall of 1954, Reynolds its Tubed Sheet about the same time. Revere's Tube-In-Strip bowed in January of this year.

Heat exchanger applications are the big thing so far. Since we live in a high-temperature world these days, heat exchange takes in a lot of territory. While producers are sure they won't be limited to that field, no matter how big, it is getting their first attention. Biggest market to date has been refrigerator components such as evaporators. Both O-M and Reynolds are currently doing a sizable business here. U. R. Jaeger, Roll-Bond sales manager, reports that virtually all refrigerator makers will be using such components on next year's models.

All producers have their eye on the freezer industry, see applications on both domestic and commercial models. But this market has involved product development work which is not yet completely finished. One problem: To position the tubes in the strip so they will be protected and still give effective chilling at competitive costs.



TUBED SHEET refrigerator evaporators made by Reynolds Metals Co. are color anodized. Appliance industry is one of biggest markets.

Auto Radiators?

Detroit, sales Mecca for so many companies, looms as the biggest potential market for patterned tubing too. Automobile radiators would be the juiciest market, and all three companies are hot after it. Revere can now provide Tube-In-Strip in both aluminum and copper-based alloys, feels this gives it an edge in view of current radiator design trends. O-M and Reynolds so far have been working only in aluminum, but are quick to point out they can add other metals.

Increasing high temperature problems make the aircraft industry a prime prospect. Self-contained cooling tubes would go a long way to increase aluminum's usefulness as an aircraft material. One aircraft company has already indicated its interest in titanium would cool if tubed aluminum works out.

Electronics is providing another attractive market. Revere is developing a unit for cooling vacuum tubes, while O-M will shortly announce a new product to provide temperature stabilization for transistors in aircraft.

Construction could some day be a giant market. Panel walls with built-in raceways, improved air conditioning and heating components, panels containing assorted water, gas and electric lines — these are being pushed.

Help:

U. S. releases uranium for domestic, foreign use.

Greater interest in the atom as a source of power for industry and science is to be generated by President Eisenhower's release of about 88,000 lb of uranium 235 for private use.

Companies and individuals in the U. S. and friendly foreign nations, except those which produce this material, will be eligible to apply for purchase or lease of some portion of the U-235. Value of the entire lot is placed at $1 billion by the Atomic Energy Commission.

The material is to be divided equally between domestic and foreign users. Until the President acted, the U. S. permitted no more than 440 lb of U-235, earmarked specifically for research reactors, to go to a foreign national or concern.

Mr. Eisenhower predicts that new availability of the uranium will help private users open new atomic power projects designed for high kilowatt capacities. Additional material will be released later if needed, he says. Fourteen domestic firms and organizations have applied for nuclear power plant permits.

Protective measures will be taken to prevent the released material from getting into munitions projects. It is to be offered in a form not easily convertible to war purposes.

Name Missile Chief

Missiles figure so vitally in air power plans that the Air Force has named a deputy director for ballistic missiles in its procurement and production directorate.

Brig. Gen. Ben I. Funk, former assistant for programming in the Air Materiel Command, is the man in the new post. He will be responsible for clearing the way for faster missile deliveries to the Air Force. Significantly, he will have his office at Los Angeles, close to plant sites of a number of missile producers.

Appointment of Gen. Funk emphasizes that missiles production cannot be raised to higher levels merely by getting additional contract authority to buy the weapons. The Air Force 1957 budget proposal calls for authority of more than $1.4 billion, compared with the present $700 million. Lead time between orders for and deliveries of missiles is 24 to 36 months, however, and the Air Force wants to eliminate hitches in getting these weapons.

Seek Younger Draftee

Government draft officials are going after younger men to staff the military services, inducting married men from 26 to 35 almost as a last resort.

A new Presidential order scraps the former system of calling up the oldest draft-eligible men in the 18 to 35 draft limits first and working down. Now, draft boards will pick first men from 19 to 25 years old who are not fathers, calling first the oldest in this group.

There are some 1.3 million eligible men in this category.

Next call will be for men in the same age brackets who are fathers. The oldest will go first. There are 150,000 eligible in this group. When these groups are exhausted, draft boards will put the pinch on the 26 and older class, regardless of whether they are fathers. Last to go will be 18-year-olds.

New system is designed to sharpen up the military and also to cut costs. Military officials say older men drafted under the previous system are preoccupied and hold up training progress, and that they raise the cost of training because of dependent allotments. Men starting their service at 26 with an eight year reserve obligation are just too old, the military says.

U. S. Mineral Buying

Government's purchase programs for domestic tungsten, chrome, mica, beryl, and asbestos —designed to stimulate production of strategic materials—are more than 50 pct complete. Manganese buying is lagging.

Latest figures from General Services Administration show that:

Tungsten purchases now total 2.3 million short ton units toward a goal of 3 million units; manganese purchases of 7 million long tons toward a revised goal of 31 long tons; chrome purchases of 101,600 long tons toward a goal of 200,000 long tons; mica purchases of 7500 tons toward a goal of 25,000 tons of hand-cobbed mica or equivalent; beryl purchases of 833 short tons toward a goal of 1500 tons, and asbestos purchases of 1261 short tons toward a goal of 1500 tons.

Plan New Bomb Drill

Government will go through its emergency paces in another mock attack this year—only more detailed, more serious than last year.

This year's mock attack—an H-bomb disaster this time—is tentatively scheduled for June. President Eisenhower, his cabinet, and thousands of government workers will spend a week at emergency relocation centers running the government.

Military exercises, or "war games" will also be scheduled during "Operation Alert 1956." Purpose of the tests is to work out some of the flaws which might develop in a mass evacuation of government during a real attack by nuclear weapons.

Last year Ike and about 15,000 government workers spent three days running the country from emergency hideaways. Defense officials discovered that damage reporting systems were faulty and that martial law would probably have to be imposed over the country in the event of a nuclear attack and resulting destruction.

EXPANSION IN INDUSTRY

MILLING:

General Electric orders giant Ingersoll machine

◆ INGERSOLL Milling Machine Co. has exceeded its own record with a new milling machine larger than the previous champ now in service at Ingersoll's Rockford, Ill., plant.

General Electric, the customer, will have invested $1.5 million in the 1.25 million lb giant when it is in operation at Schenectady GE plant producing heavy power generators.

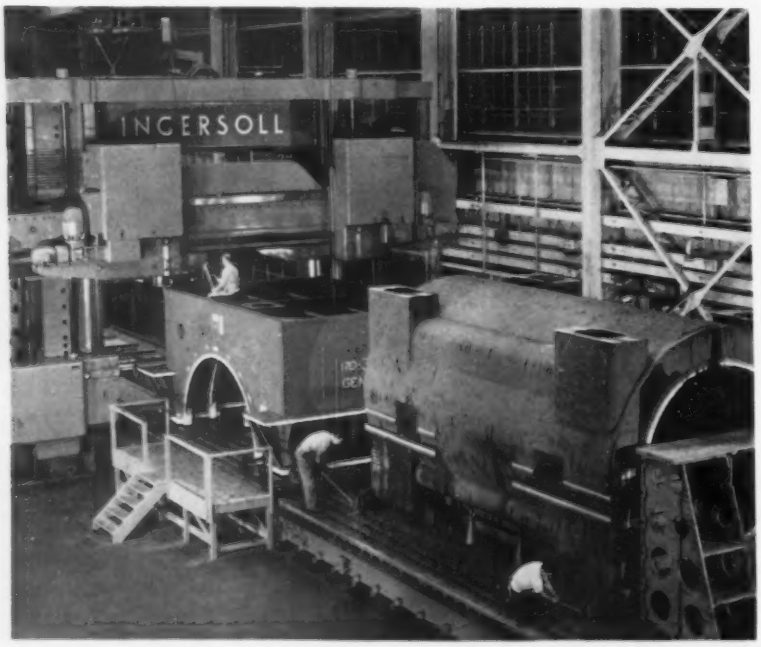
How big is the biggest? The unit is 35 ft high, 42 ft wide, and 120 ft in length. Two workpieces shipped by GE for test runs of the miller weigh 72 tons and 53 tons, respectively.

Ingersoll's giant underlines the increasing demand for equipment capable of turning out power generating equipment at a faster rate. It's been estimated that the electrical generating equipment market is now doubling every 10 years.

Despite its size the milling machine is designed to increase the speed at which massive, thin-walled steel weldments can be turned out. The heavy, box-like parts are machined to a steam-tight (.003 inch tolerances across a 16 ft surface) fitting that will enclose the low pressure section of electric generator turbine and support the turbine rotor.

A major problem in machining the heavy weldments is setup time. Ingersoll's machine has a split table, one unit being 22 ft in length, the other 30 ft. Both are 17 ft wide, travel 120 ft bedways. One workpiece can be machined as a second is placed on the other table.

Examination of the guest register at Ingersoll suggests that builders of heavy diesels, power shovels, heavy cranes and hoists, steel mill equipment are interested in checking over the possibilities offered by equipment of this size. At one stroke the installation of the milling machine at GE will reduce lifts of the workpiece by about 50 pct. Worth considering: faster handling at the machine can mean simplification in handling all the way back through a plant to the inventory stock bins; more predictable and faster handling speeds mean a less unwieldy inventory.



LARGEST MILLING MACHINE, constructed by Ingersoll Milling Machine Co., is 35 ft high, 42 ft wide, 120 ft in length. Machine will be used in large power generating equipment manufactured by General Electric.

Expansion Briefs

Reeves Instrument Corp., subsidiary of Dynamics Corp. of America, New York; new plant Mineola, N. Y.; increase floor space 30 pct; cost $5 million.

Armstrong - Blum Manufacturing Co., Chicago; metal cutting machines; purchased adjoining plant; double production space.

Circo Equipment Co., Rahway, N. J.; manufacturers of metal cleaning equipment; double size of plant and facilities; cost $100,000.

Techalloy Co., Inc., Rahns, Pa.; alloyed wire, rod and strip manufacturer; new 10,000 sq ft plant addition, new rolling equipment; cost $250,000.

International Business Machines Corp., new manufacturing, engineering, educational facilities; Rochester, Minn.; cost $8 million.

Surface Combustion Corp., Toledo, O.; new building adjacent to plant, increase capacity by 33 pct.

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

Hot acid scrubs tomorrow's refrigerator

A typical example of B. F. Goodrich improvement in rubber

THAT sheet of steel will soon be a refrigerator—*gleaming white* because of the steaming hot acid bath.

To clean rust off steel so enamel will stick, miles of sheets are run through tanks of hot acid that eats off the film of rust. B. F. Goodrich made this low-cost method practical by developing a rubber and brick tank lining that stands the hot acid and the slicing, banging of fast-moving steel.

The sheets used to move over stationary skid blocks but these soon wore out with rubbing plus heat plus acid. Now B. F. Goodrich makes a series of small rubber rolls that really turn and the one remaining reason for frequent shutdown has been cured. What's more, the new B. F. Goodrich segment rolls cost one-third less than the old-fashioned type, yet last 3 times longer.

B. F. Goodrich specializes in rubber equipment to handle acids and other corrosive chemicals. Today you'll find B. F. Goodrich rubber covered rolls and rubber lined tanks, pipes and valves in the most modern plants. More important, you'll find rubber lining in some places where it has lasted 15 and even 20 years.

When you buy B. F. Goodrich lining you buy years of engineering background with it—experience that makes sure your lining will be exactly fitted to meet all the special requirements of your work. You buy something else, too—assurance of satisfactory performance that can come only with a product that has proved itself by years of success in actual use. *The B. F. Goodrich Company, Dept. M-568, Akron 18, Ohio.*

B.F.Goodrich
INDUSTRIAL PRODUCTS DIVISION

New mill on TIMKEN® bearings tapers 10′ x 33′ aluminum sheets for aircraft wings

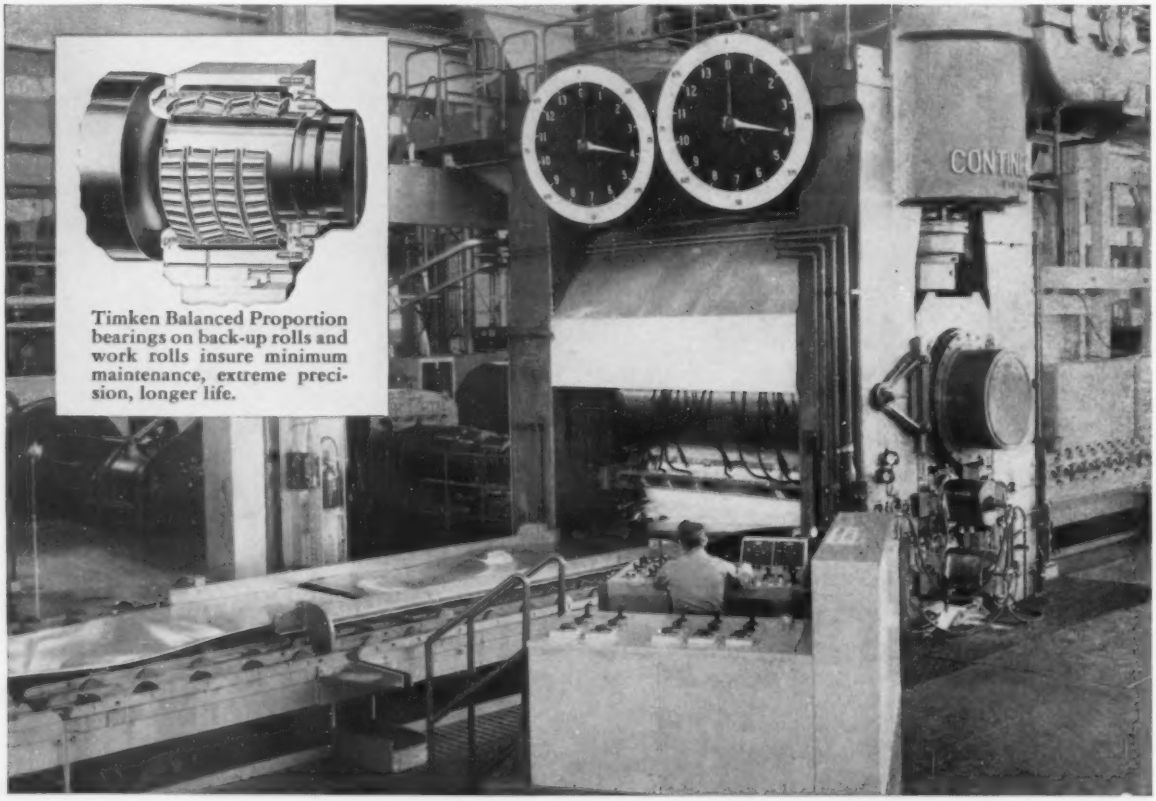
A 4-HIGH reversing mill, 23″ x 60″ x 144″, which tapers aluminum sheet and plate up to 10′ wide and 33′ long, is now in operation. This mill is used for the fabrication of tapered sheet and plate. Tapered sheet and plate products permit the fabrication of modern aircraft of increased speed and increased carrying capacity at no sacrifice in strength. Built by the Continental Foundry & Machine Division of Blaw-Knox Company, this huge new rolling mill uses Timken® tapered roller bearings on back-up rolls, work rolls, screw-downs and breaker blocks.

Timken balanced proportion bearings give this mill the extreme precision required in such rolling operations. Timken balanced proportion bearings have load ratings up to 40% higher than the same-size bearings in older designs. In some mills, they increase bearing life expectancy almost three times. And the mill can be stopped and restarted without altering or relieving screwdown pressures.

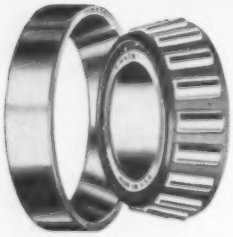
Timken bearings, because they're tapered, take both radial and thrust loads in any combination. They practically eliminate friction because they're designed by geometrical law to have true rolling motion. And made with extreme accuracy to conform to their design.

Always specify Timken bearings in the equipment you build or buy. Look for the trade-mark "Timken" stamped on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



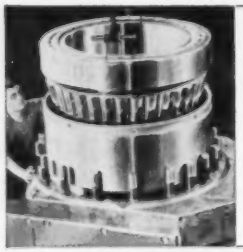
Timken Balanced Proportion bearings on back-up rolls and work rolls insure minimum maintenance, extreme precision, longer life.



TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



ROLL NECK BEARING ENGINEERING SERVICE

Our field and service engineers have had years of experience with problems of roll neck bearing design and operation. They'll help you select bearings and design mountings. Only Timken tapered roller bearings have these advantages: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. Timken fine alloy steels.

NOT JUST A BALL ◯ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◫ AND THRUST ◫ LOADS OR ANY COMBINATION ✳

REPORT TO MANAGEMENT

Who Profited Most in 1955?

Don't be defensive about 1955 profits. If your company showed average progress and took advantage of the booming markets of the past year, its profits before taxes were probably about 22 pct higher than in 1954. (If your company had real enterprise, it probably did a lot better than that.)

The defensive angle comes in when the 22 pct gain of corporate earnings is measured against the increase in total national income of 7½ pct. And, according to the U. S. Dept. of Commerce, employee compensation rose only 6½ pct.

But percentage increases of 1955 over 1954 don't tell the whole story. Instead of corporate earnings jumping at the expense of a smaller increase in employee compensation, the 1955 gains merely restored the percentage of profits to national income that was normal in 1953.

In 1954, when a business decline was in progress, corporate profits dipped substantially. On the other hand, annual payrolls slumped only 1 pct. This might be something to keep in mind if inflated profits are implied.

The Inventory Buildup Picture

You have heard a lot about the inventory situation throughout industry. It goes without saying that most manufacturers have been scrambling to pick up workable inventories throughout the second half of 1955. In fact, some "authorities" think inventories have been built up to the point where dangerous liquidation such as that of 1954 could follow.

But this does not appear to be the case. You don't have to expect any wholesale inventory cutbacks while so many materials are in short supply and manufacturing stocks out of balance.

The facts are that manufacturers' inventories increased $2½ billion in book value during 1955. Almost all of this, nine-tenths to be exact, was accounted for by the durable goods industries.

But you have to take into consideration that 60 pct of the rise is in higher replacement costs, as reported previously. Only two-fifths of the increase was in increase in physical volume.

Where Did the Buildup Occur?

More than a third of the increase in manufacturers' inventories went to transportation equipment—notably automotive. The metals industry and machinery producers each added $500 million to their stocks.

Very little of the inventory boost occurred in accumulation of finished goods. Most of it is in materials and goods in process.

Here's the breakdown in all durable goods industries. Purchased goods inventories during the year climbed from $14.6 billion to $15.2 billion. Goods in process gained from $12.4 billion to $14 billion. Finished goods increased only $200 million.

Looking at it from another viewpoint, manufacturing industries increased their stocks of primary metal from $3,235,000,000 to $3,521,000,000. Fabricated metals value increased from $2,440,000,000 to $2,734,000,000. Machinery inventories gained from $7,881,000,000 to $8,455,000,000.

What About the "Defense Cycle?"

Economist Eliot Janeway (P. 30) presents a new theory of business forecasting, based on the "Defense Cycle" rather than the conventional "Business Cycle." It's a provocative idea in these times when Big Defense appears to be a near permanent factor in our economy.

INDUSTRIAL BRIEFS

Square Deal . . . Veterans Administration and the Small Business Administration acted jointly to attempt to assure small firms a fair share of VA business. New policy calls for setting aside many purchases for exclusive competitive awards to small firms. VA spends approximately $200 million a year for goods and services of all types. More than 50 pct is reported to go to small firms.

Yen For Equipment . . . Japanese Dept. of Defense has purchased special aircraft ground support apparatus from Bogue Electric Manufacturing Co., Paterson, N. J. It is reported the portable aircraft ground power equipment will be used at Air Force bases in the Far East to start, test and check-out aircraft being built in Japan in accordance with the Japanese Defense Agency in agreement with the U. S.

No Connection . . . Iron Age Div., H. Childs & Co., Inc., manufacturers of safety shoes, has increased storage and service facilities by over 50 pct with the construction of an addition to the company's warehouse in Pittsburgh.

Canadian Scrap . . . Luria Brothers & Co., Inc., leading scrap dealer, has opened an office in the Royal Bank Bldg., Toronto, the second in Canada. Total Luria offices, nineteen.

German Steel . . . Marathon Export G M B H, export Div. of Deutsche Edelstahlwerke, A. G., Krefeld, Germany, has reopened offices in the U. S., in New York.

One For All . . . Pittsburgh Foundrymen's Assn. is now affiliated with the American Foundrymen's Society as the 44th industrial chapter of the larger group.

Atomic Transportation . . . The Dept. of the Army has awarded a contract to the Nuclear Development Corp. of America, N. Y., for a study to determine the technical feasibility of applying nuclear power to Transportation Corps equipment used in land and water operations. Items to be considered will include certain rail locomotive equipment, several types of Army harbor and inland waterways craft and special cargo-carrying land vehicles of very large size known as "land trains."

No Fueling . . . A 2-high hot and cold, reversing mill to process atomic fuel elements, has been ordered by Combustion Engineering Inc., N. Y., from Birdsboro Steel Foundry and Machine Co., Birdsboro, Pa.

Impact . . . General Dry Batteries, Inc., Cleveland, has begun full-scale commercial production of impact extrusions for industry. Aim is to produce a wide variety of cylindrical and rectangular parts for industrial and military uses.

Get The Lead Out . . . Kaiser Engineers Div., Henry J. Kaiser Co. has been awarded a contract by the St. Joseph Lead Co. for the design, procurement and construction of a steam power plant at Josephtown, Pa., to cost approximately $16 million.

Indian Heavy Water . . . Vitro Engineering Div., Vitro Corp. of America has been granted a preliminary study contract from the Government of India for a large heavy water and nitrogen fertilizer plant to be built in the Bhakra-Nangal area of North India on the Sutlej River. The heavy water is a key material in the nuclear power and research program planned by the Indian government. Nitro-lime fertilizer will be used for wheat, cotton and millet crops.

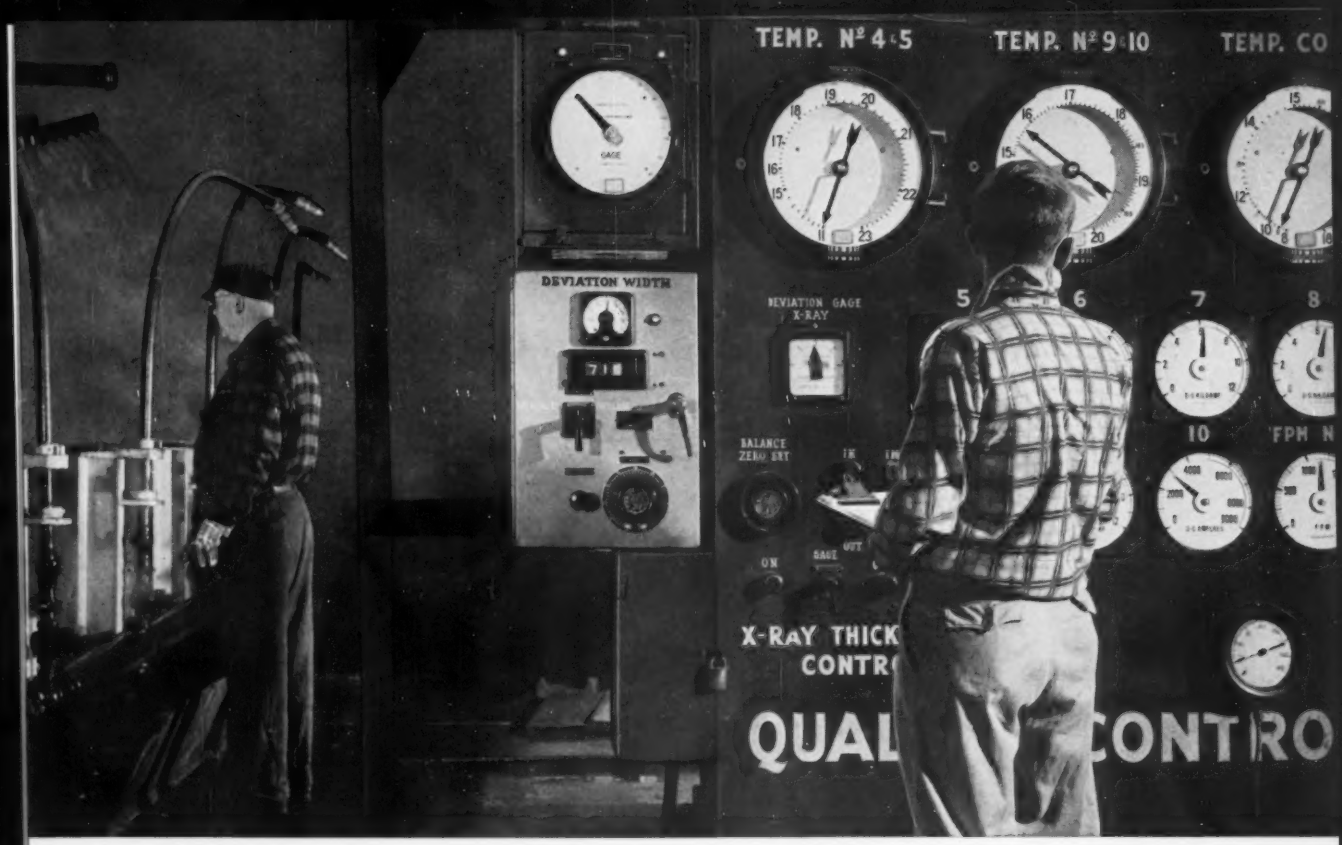
Mighty Mouse . . . An $829,000 contract for the production of rocket motors for the Mighty Mouse aircraft rocket has been awarded by the Navy Dept. to The Colson Corp., Eyria, O. The Mighty Mouse rockets are used for air to air firing and are installed on a wide variety of jet and piston aircraft of both the Navy and Air Force. The Navy Bureau of Ordnance acts as the procurement dept. of both services.

Strategic Progress . . . Metallurgical Resources, Inc., N. Y., has purchased a 26 acre riverfront industrial property in Newburgh as the site of a new strategic-metals processing operation. Installation will feature a new process to extract greater quantities of rare and strategic metals, such as cobalt, columbium, tantalum, chromium and nickel than previously was possible from complex ores.

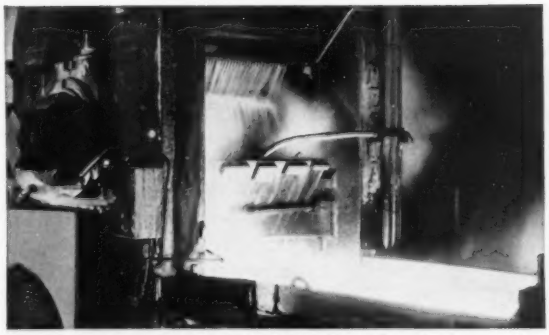
West Hoist . . . Fabricating Div. of Kaiser Steel Co., Montebello, Calif., has been appointed west coast sales and service depot for electric hoists manufactured by Yale & Towne Manufacturing Co., Philadelphia.

More Wheels . . . Electro Refractories & Abrasives Corp. has established a new product engineering dept. in its grinding wheel division.

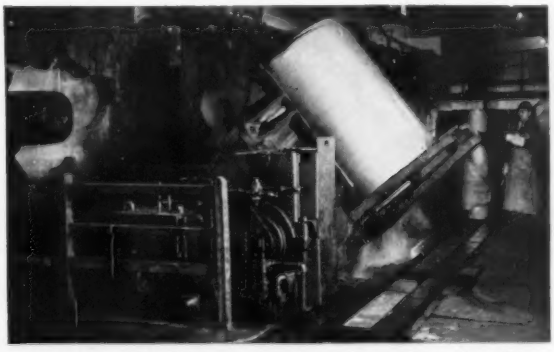
Worth Thinking About . . . Five employees of Tennessee Coal & Iron Div., U. S. Steel Corp., Birmingham, Ala., have received a total of $7,000 for ideas submitted under the company's suggestion program. Awards are for suggestions to improve production or safety, eliminate waste, or cut costs.



How Great Lakes Steel *guides* quality



FIRST QUALITY CHECK is made at No. 1 Mill Stand. Here, an electronic pyrometer relays the strip's temperature to the panel.



FINAL CHECK in this operation is made at the coiler. From slab to coil, the control panel spells far better quality.

Here's one of several electronic operation panels that take the guesswork out of quality control at Great Lakes. You'll find this one guiding the entire operation of the 96-inch continuous mill.

As the red-hot strip races from roll stand to roll stand and on to the coiler, the temperature, speed, width and thickness of the strip *at each stage* are instantly shown on the panel.

A glance at the panel tells the operator if any adjustments are necessary to assure a finished product of the highest quality—a product that will stand the rigid test of your specifications.

This is further proof that Great Lakes has what it takes—the experience and the very latest equipment—to make your product even better. Our representative is just one telephone call away.

GREAT LAKES STEEL CORPORATION

Ecorse, Detroit 29, Michigan • A Unit of

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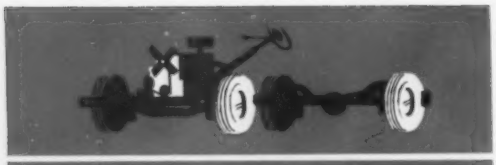
District Sales Offices: Boston, Chicago, Cincinnati, Cleveland, Grand Rapids, Houston, Indianapolis, Lansing, Los Angeles, New York City, Philadelphia, Pittsburgh, Rochester, St. Louis, San Francisco, Toledo, Toronto.



AUTOMOTIVE ASSEMBLY LINE

Why Auto Horsepower Goes Up and Up

Upward trend is not just advertising gimmick . . . Trend was delayed by war . . . Load on engine from weight, power features and riding ease demands make more power necessary for performance—By *T. L. Carry.*

◆ THE AUTO industry has never been lacking critics who throw brickbats at it for bragging about the amount of power contained in its products today.

The usual argument is that increased horsepower increases the speed of a car and therefore is a safety hazard.

There is no doubt that the more power a car has the faster it can go. But whether it is a safety hazard is open to debate. There are other factors to be considered before anyone takes a firm stand on the question.

A brief review of engine development shows that in the last 15 years the amount of horsepower has increased from an average of 107.8 in 1940 to 173.8 in 1955.

In almost all cases, the power increase was forced upon engineers who had to compensate for other improvements being made in automobiles.

Must Look Ahead . . . As far back as the 1930's engineers began to exploit the idea of increasing an engine's power by raising its compression ratio. Progress at the time was delayed because of design factors involved and the lack of a fuel that would detonate properly at high compression ratios.

Also at that time, it became the accepted practice to design an engine so that it would satisfy the power requirements of a car for many years. By slightly modifying the design each year, the power could be increased until the limit was reached. Thus, it would not be necessary to design a complete new engine each year to keep pace with other less expensive improvements.

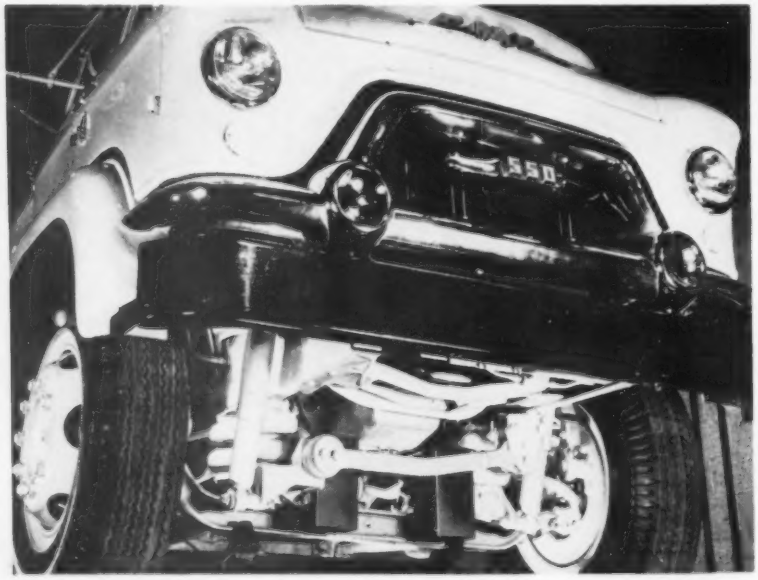
Changes Delayed . . . In 1942, engines were reaching their practical limits and World War II delayed any further developments along that line.

After the war, most manufacturers made a major change and, by 1950, nearly all had switched to V-8 engine. The V-type offered several advantages over old, in-line designs. It was more compact and offered better fuel economy.

Like their predecessors, these engines were designed for the future. But the public demand for more power made it necessary to exploit the potential much sooner than expected. As a result, the average horsepower increased more since the end of World War II than it did for 20 years preceding the war.

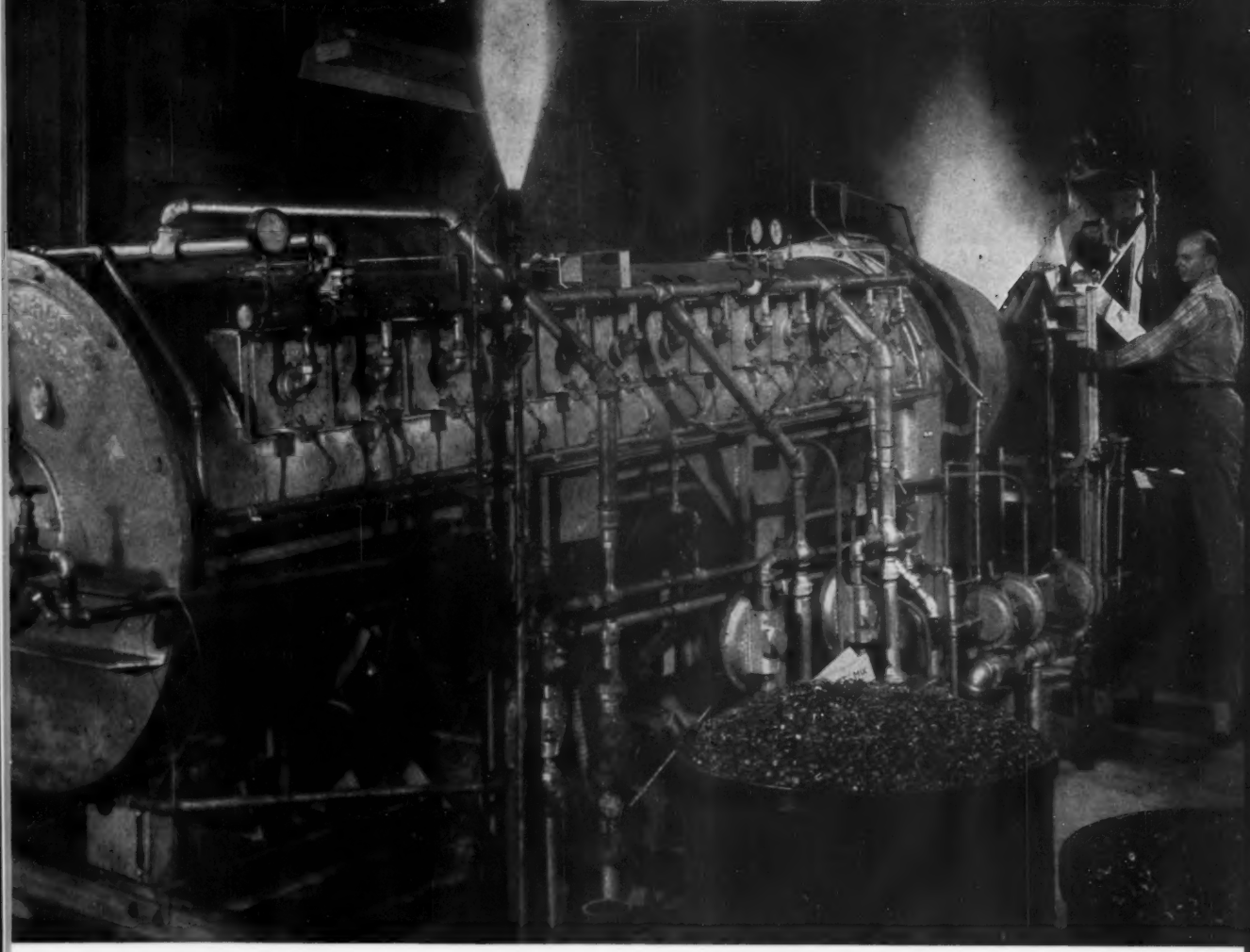
There are several good reasons for this, not all of which reflect a tendency for the industry to get into a power race just for the sake of bragging.

What Public Wants . . . The driving public today demands that cars perform better and better all the time. Motorists insist that their cars be able to accelerate quickly, to pass other cars in short distances and climb hills easily. They also want a car with a reasonable amount of fuel economy



AIR RIDE SUSPENSION prototype for truck tractors is shown by GMC Truck & Coach Div. of General Motors. Mounted between front axle and frame, dual bellows replace leaf springs in front assembly for smooth ride.

RB&W FASTENERS - *Strong Point of any assembly*



Gas chamber for fasteners that lengthens their life

CARBURIZING of fasteners is being done here . . . *GAS* carburizing. This method stands head and shoulders above the bath type treatment. It gives greater control of surface hardness, of quality.

Above, Gene Luzzi, has just loaded a hopperful of *Spin-Lock* screws into the chamber. Heated and then quenched under his experienced eye (11 years with RB&W), the screws emerge with deeper, more uniform case hardness, and controlled core strength. RB&W hinge pins, tapping screws and other fasteners get their longer life in this department.

If there's a better method or some extra special equipment that can help turn out the best fasteners possible, you're sure to find it in RB&W plants. With the most modern and complete facilities available, RB&W's skilled operators — many of whom are second generation RB&W men — can put their experience to best advantage.

This combination of facilities, experience and quality control can't miss. It assures you more quality for your money . . . a reliable source of supply . . . and strong fasteners that never let you down.

Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N. Y.

R B & W

110th year

Plants at: Port Chester, N. Y., Coraopolis, Pa.; Rock Falls, Ill., Los Angeles, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. **Sales agents at:** Milwaukee; New Orleans; Denver; Seattle. **Distributors** from coast to coast.

Eaton
Permanent Mold
Gray Iron Castings
Meet Critical Quality Requirements
in a Wide Range of Applications
In applications where more than ordinary quality is required, Eaton Permanent Mold Gray Iron Castings provide a number of desirable characteristics:
Dense non-porous structure
Uniform structure throughout the casting
Machinability at higher feeds and speeds
Higher tensile strength
Ability to take high surface finishes
Freedom from leakage under pressure
These qualities particularly recommend Eaton Permanent Mold Gray Iron Castings for such uses as high pressure control mechanisms, refrigeration and air conditioning parts, power steering and power braking components, household appliance parts, and for many other critical applications.
Eaton engineers will be glad to discuss the application of Eaton Permanent Mold Gray Iron Castings to your products.
EATON
FOUNDRY DIVISION
MANUFACTURING COMPANY
VASSAR, MICHIGAN

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
FEB. 25, 1956	130,953	24,295
FEB. 18, 1956	134,366	24,541
FEB. 26, 1955	179,406	15,673
FEB. 19, 1955	180,914	15,730

*Estimated. Source: *Ward's Reports*

and one with a reserve amount of power in case of an emergency on the road. All of these things could not be possible if the horsepower had not been increased.

Today's cars are much heavier than they were 20 years ago and they are loaded with accessories. Automatic transmissions, power attachments, radios and heaters make driving more pleasurable but they also add to a car's weight. Bigger tires afford a smooth ride but at 60 mph they consume as much as 12 hp. Such things as the fan, generator and oil pump also subtract from the amount of power that ordinarily could be used for driving.

Power Needs . . . The load the engine has to pull affects the performance of a vehicle. So the power in today's engine must necessarily be proportionate to the weight it has to pull and the accessories it has to operate.

Engineers are constantly faced with the problem of increasing a car's performance. They can do this by either increasing an engine's horsepower or decreasing the weight of a vehicle. If the weight is decreased, it is necessary to discard many things that American drivers have come to expect in a car such as comfort, power features and other accessories.

There are other advantages for big engines. One of these is fuel economy. Today's engines are so designed that the gasoline burns more rapidly and this contributes to fuel economy. In addition, lower axle ratios save wear and tear on the engine because it turns slower at cruising speeds.

As long as the public keeps demanding better performing cars, the industry is in the power race to stay, for better or worse.

Safety Belts Ordered

Safety belts for front seats will be standard equipment on all company cars driven by sales and service engineers of Electro Metallurgical Co., major supplier of ferro-alloys and metals.

Instructions issued by company officials were based on favorable results of studies of several safety agencies and the general availability of safety belts on current model cars. The company is active in promoting plant safety and has received considerable recognition for its safety activities.

Financial:

Ford earnings tops despite stock slump.

Speculators along with old-time investors have been expressing disappointment at the decline in the price of Ford stock since it was placed on the market.

But people who bought the stock with the idea of getting rich quick are probably more disappointed today than those who were looking for a good, solid investment.

A preliminary statement to Ford's first annual report shows that the company's sales, earnings and production in 1955 were the highest in its history.

Complete figures on the company's 1955 operations will be contained in the annual report to be released at the end of March.

Ford's net sales in 1955 exceeded $5 billion for the first time, reaching $5,594,000,000, which is 38 pct above 1954 sales.

The company's net income was $437 million, 92 pct above the 1954 figure. Earnings are equal to $8.19 a share, although it has already been decided that dividends for the first quarter will be 60 cents a share.

Ford's assets at the end of last year were up nearly $500 million over 1954 and totaled $2,585,300,000. Net worth is $1,868,200,000.

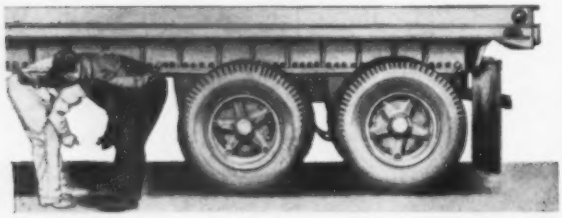
Total production in 1955 was 2,614,558 cars and trucks. This is an increase of 31 pct over 1954.

It is obvious that even if the company's stock doesn't skyrocket overnight and dividends might leave something to be desired, Ford is doing all right.

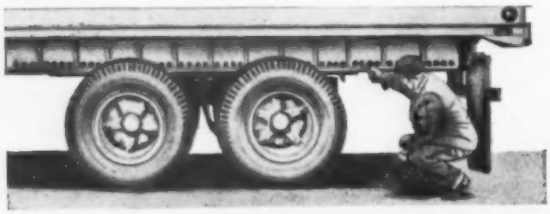
THE BULL OF THE WOODS — By J. R. Williams

WITH THAT MANY OF TH' BIG BRASS INTERESTED IN WHAT I'M DOIN', I'D CONSIDER MYSELF A VERY IMPORTANT GUY WITH A LOT OF RESPONSIBILITY!
THAT'S TH' FUNNY PART--THEY'VE OFFERED ALECK A FOREMAN'S JOB SEVERAL TIMES BUT HE'S SAID, "NO, I DON'T LIKE TH' RESPONSIBILITY," AN' THAT JOB WOULD COST THOUSANDS IF HE'D WRECK IT--A FOREMAN CAN BLAME TH' GUY WHO'S DOIN' IT!
T.M. Reg. U.S. Pat. Off.
© 1956 by NEA Service, Inc.
THE QUEER GUY
J.R.WILLIAMS 2-29

Wrought Everdur* Cuts Cost in Half

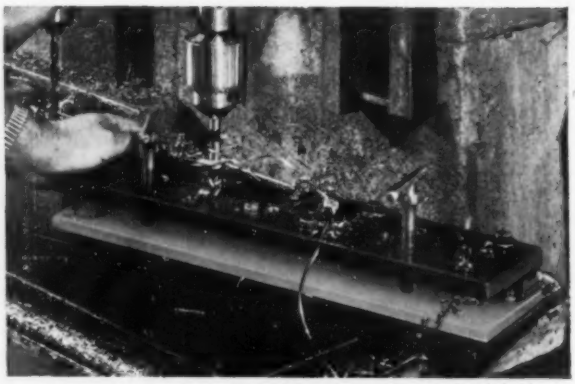


THE TRAILMOBILE SHIFTABLE TANDEM—Truckers often lose time and money in shifting trailer cargo, changing tractors, or cutting payload to meet legal axle-weight requirements. Now, however, they can balance any load in just five minutes by moving the Shiftable Tandem Axle Assembly made by Trailmobile Inc., Cincinnati, Ohio. The axle assembly slides forward or backward, as needed, along a stainless steel rail on four shoes of wrought Everdur. It can move 66 inches and be locked at 3-inch intervals by locking rods through holes in the rail.

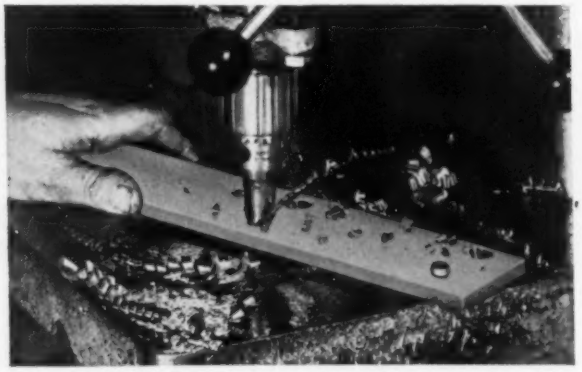


EVERDUR CAN TAKE THE LOADS AND SPLASH—One of the shoes of wrought Everdur installed in the Shiftable Tandem frame. An Alemite fitting in center hole and oil grooves provide lubrication. The Everdur shoes carry normal tandem loads of 32,000 pounds day and night, and slide freely under this pressure. Resistance to corrosion is another reason why Everdur was selected, for unlike the trailer's cargo, the Everdur shoes are exposed to road splash of varied mixtures.

Wherever metal must resist corrosion, be strong and tough, and be available in forms easily fabricated, consider Everdur, Anaconda's family of copper-silicon alloys. The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. *Reg. U.S. Pat. Off. 5661



HOW WROUGHT EVERDUR CUT MATERIAL COSTS—Trailmobile first tried high-tin bronze castings for the shoes on which the assembly slides. But rejects for porosity and warpage in the thin cast section were a costly problem—and all surfaces had to be finish-machined. The wrought Everdur bar stock suggested by Anaconda's technical experts has surfaces satisfactory as delivered—ready for drilling holes (shown above).



HOW WROUGHT EVERDUR CUT LABOR COSTS—The castings formerly used were not uniform. Hard spots made surface machining difficult and expensive. The entire operation was unnecessary with wrought Everdur bar stock—reducing labor cost by about 50 per cent. (Above) Countersinking holes for screw fastenings.

WROUGHT EVERDUR IS READILY MACHINABLE—Though tough and dense, wrought Everdur is uniform and poses no special problems in machining. Oil grooves are shown being milled in the shoes.

EVERDUR

ANACONDA® COPPER-SILICON ALLOYS

THIS WEEK IN WASHINGTON

Air Force Warns On Flash War

Next one will be over in hours, say top generals . . . Brief nuclear exchange will rock nations . . . Danger brings strong pleas for dispersal of defense industry . . . Little progress—By G. H. Baker.

◆ A MAJOR WAR of the future will be lightning-fast, totally destructive, and probably will last only a few hours—or at the most, a day or two.

Top Air Force generals are stressing these sobering points in their private talks with congressmen. They are emphasizing that the old concepts of land marches, trench warfare, and sieges will probably never again in our time be brought into play.

This line of reasoning is based on the belief that both sides will let loose violent exchanges of their nuclear weapons. More destruction will be wrought in a few hours than in all the wars of history put together.

The nuclear bombing of Japan in World War II, terrible as it was, will be "very mild" in comparison to what can be done by late-model bombs now on hand.

Dispersal Vexes . . . Most vexing problem around Civil Defense headquarters: How to get industry dispersed out of "critical" areas. Blunt truth of the matter is that the nation's key industries are very little more dispersed (not at all, in many industries) than they were 10 years ago. (THE IRON AGE, Jan. 19, '56, p. 27.)

Industry officials tell the government they are sympathetic with the planning problem, but no one company can afford the staggering cost (it will run into millions of dollars per company) involved in moving to new locations.

This is a tough nut to crack. An increasing number of government officials are coming around to the idea that special incentives (fast amortization, for example) will have to be offered in order to achieve even a modest start on dispersal.

What's Needed . . . One official (Lloyd Berkner, nuclear physicist) says we've got to get at least 30 pct of vital industry (metalworking for defense contracts, food industries, key military supplies) transferred out of the 200-plus major target areas in which they are now located.

Mr. Berkner agrees 100 pct with President Eisenhower that the overall goal is to create conditions of strong defense which will discourage an enemy from starting a war. But dispersal ought to be pushed—just in case.

Britain Buys Here . . . U. S. firms capable of taking on government contracts for guided missiles will probably get some additional business soon in the form of new British orders.

The orders will be paid, however, by the U. S. It's part of a plan whereby this country will foot the bills for a part of Britain's heavy defense costs.

Chancellor of the Exchequer Harold MacMillan has ordered deep cuts in his 1957 defense budget. Some experimental projects, such as new missiles, are to be turned over entirely to the U. S. government.

Seek Satellite Sleuths . . . The Smithsonian Institution is determined not to lose sight of the man-made satellite that will whiz around the earth in 1957 or 1958. Smithsonian directors are asking amateur astronomers on every continent to track the mechanical satellite through binoculars and report their observations back to Washington.

"After all the trouble and expense of placing a man-made satellite in the sky, we can't afford to let it get lost," the Smithsonian says.

A series of rockets will start the satellite on its way. It will loop around the earth once every 1½ hours in an elliptical path, ranging from 200 miles to 900 miles from earth. After several

Treasury Digs In

▪ Businessmen apparently won't have to worry if this country is ever subjected to a bombing attack—there still will be money available. The government has stashed away money at various points to make sure that the country keeps running after such an attack.

▪ The program of insuring the supplies of currency and bank credit also encourages banks to take steps to protect their vital records and their deposits so that the economy would not come to a standstill in case of an emergency.

ONE OF A SERIES . . .

What makes a cylindrical roller bearing good?

The RIGHT ROLLER DESIGN and QUALITY CONTROL

The design and quality of the *rollers* play a large part in the performance of a cylindrical roller bearing. At right are some of the vital factors which must be considered.

All these factors are scrupulously controlled by the most modern precision equipment to insure maximum performance and life for every HYATT Roller Bearing. You'll find more details in HYATT General Catalog No. 150, or your nearby HYATT Sales Engineer will gladly help you choose the type best suited to your requirements. Remember, HYATT is America's *first* and *foremost* maker of cylindrical roller bearings. Hyatt Bearings Division of General Motors, Harrison, New Jersey.

GM GENERAL MOTORS
HYATT
ROLLER BEARINGS

1. DISTRIBUTION OF LOAD WITHIN THE BEARING

Rollers are subjected to load only while in the "load zone," with maximum load while on the line of action of the bearing load, as shown in diagram 1. The theoretically perfect "load zone" extends from −90° to +90° from the line of action, but this is neither practical nor necessarily desirable. Under normal loadings, the actual "load zone" may range from 90° to 120°, depending on load and mounted internal clearance. This distributes the load so the load on the heaviest-loaded roller is approximately 5/N times the bearing load, where N is number of rollers.

1

2. DISTRIBUTION OF LOAD WITHIN ROLLER'S AREA OF CONTACT

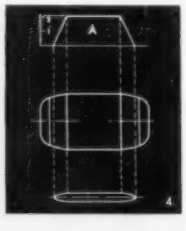
A cylinder deflects locally in the region of engagement when loaded between flat plates. The plate also deflects, so the original line of engagement is broadened into a "dog-boned" area under load, as shown in diagram 2. Moreover, deflected cylinders must gather in metal at their ends in *two planes, and this end-loading effect can seriously reduce the life of a cylindrical roller bearing.* All HYATT rollers have generous corner radii or blended chamfers to reduce end effect; and all HYATT Hy-Load rollers also have crowning to allow the contact area to "fade out" evenly (diagram 3).

2

3

3. DISTRIBUTION OF LOAD ACROSS ROLLER

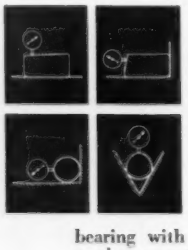
The unit load on any roller is uniformly distributed axially except at the crowned ends where it drops off to zero as shown in diagram 4. The summation of unit loads represented by area A is the total roller load. This same load under misalignment results in an area equal to area A; but maximum unit load is considerably greater and the bearing will have a shorter life than a properly aligned one. When the same total load is applied to an *uncrowned* roller, an even higher unit load results. This demonstrates the value of crowning when misalignment occurs.



4

4. EFFECT OF ROLLER QUALITY ON BEARING PERFORMANCE

Lack of roller quality control has a very adverse effect on performance: 1. A roller with excessive *taper* tends to uneven load distribution and abnormal temperature rise. 2. A roller with excessive *end square* tends to noisy bearing performance. 3. A roller with excessive *two-point out-of-round* tends to poor segregation and poor bearing life. 4. A roller with excessive *three-point out-of-round* tends to noisy bearing operation. 5. A roller with *poor finish* tends to wear on all operating surfaces and noisy operation. 6. A bearing with excessive *roller-to-roller diameter variation* tends to poor bearing life. 7. A bearing with excessive *roller-to-roller length variation* tends to poor thrust capacity, abnormal temperature rise.



days or possibly a week or more, friction will take its toll and the man-made "moon" will crumble away into dust.

About a dozen aircraft and electronics manufacturers are being called in on the contracting and subcontracting for components.

Phony Tax Agents

Businessmen and individuals should make it a point to demand credentials of anyone representing himself as an Internal Revenue Service agent — especially those who may want to see company records or ask for cash payment.

Several district IRS offices are reporting complaints of phony tax agents seeking money or a peek at corporate records. All revenue agents carry pocket "commissions."

In the wake of the reports of phony tax agents, IRS says it prefers that tax payments be made by check, rather than cash although agents are empowered to give receipts for cash payments.

Roads:

Federal program on the way but tax plans disputed.

Demands for better roads have convinced Congress that some bold new federal roadbuilding action is long overdue, but truckers and motorists are arguing hotly in the committee rooms of the Capitol over who'll pay for them.

Both sides are agreed that an additional $1 billion worth of federal aid every year is the minimum money assistance acceptable.

This $1 billion minimum will be in addition to the $875 million in "regular" federal - aid highway funds that Congress makes available to the states each year under the dollar-for-dollar plan.

Truckers Protest

Truckers are being asked to carry the biggest part of the new tax burden. Most of them are willing to do so, but they are protesting that the American Automobile Assn., speaking for the private motorist, is trying to duck financial responsibility.

AAA wants to load virtually all the new expenses of building roads onto the nation's 3½ million truckers of industrial goods and farm commodities, the truckers claim.

This week the lawmakers are working hard on both the bill to carry out the huge roadbuilding project and the measure that is to provide funds for the job. Congress is putting special stress on the financing issue, involving higher automotive excises to raise more federal money for highways.

Atoms:

AEC opens plants for private nuclear work.

Private industrial projects in the nuclear energy field now may be performed, within given limits, in plants of the Atomic Energy Commission.

In keeping with a new AEC policy, private firms and individuals will be able to use the agency's facilities and equipment if the users have security clearance, the work will not interfere with AEC programs, and private plants are not readily accessible. If demand becomes high, the AEC will set priorities for use of property.

The agency will assess charges based on full recovery of costs or on commercial rates, if such rates have been worked out.

Contractor Eligible

Users also will have to comply with AEC patent provisions and with health, safety, and security rules. They must be prepared to settle claims resulting from performance of private work.

Companies and institutions providing services to the AEC under contract will be allowed access to facilities under the same terms as other private enterprises. If a contractor handles his own project in a plant he runs for the AEC, he must segregate costs.

A user of AEC facilities is to get an irrevocable, nonexclusive, royalty-free license to inventions or discoveries made during the work. Granting of the license will be subject to AEC security rules.

Filing Date Nears

Companies with defense contracts have been notified by the U. S. Renegotiation Board that they have until May 1 to claim the standard commercial article and service exemption, if they file at the same time their renegotiation reports for the year.

Final claim date for those contractors who are not preparing renegotiation reports was March 1. Both the May 1 and March 1 dates apply to contractors whose fiscal years ended last Dec. 31.

Exemption provided in the amended Renegotiation Act is on a yearly basis. Contractors whose claims were approved for the reporting year 1954 must file again in order to get the exemption for the year 1955.

Form of reporting to the Board was changed slightly by regulation last August, the agency advises contractors. Information considered applicable to 1955 operations may be referred to and not repeated in the new report, if it has been submitted in connection with an earlier exemption claim.

▪ Dave Beck, president, AFL-CIO Teamsters, says he's for Ike. This puts Beck almost in a political class by himself. Leaders of almost all other AFL-CIO unions customarily endorse Democrats.

"President Eisenhower is a great American," Beck says. "He has made some mistakes, but every decision he has made was in the best interests of America as he envisions it. On the whole, I am in support of him."

Beck also believes that unions should keep out of politics. The AFL-CIO is essentially an economic organization, he says, and should concentrate on this assignment and should avoid getting embroiled politically.

The INSIDE STORY of INTERNAL GRINDING by NORTON

An Unusual Set-Up

Grinding bearing housings with a Norton wheel on a Dumore tool post grinder, mounted on a horizontal boring mill. The grinder itself revolves in a planetary motion, the grinding wheel spindle following the I.D. of the hole. To grind the other end of the housing the work table is turned 180°. *Material:* cast steel. *I.D.:* 7.8737″. *Stock removal:* .005″ each end. *Limits:* +.0001″, —.0004″. *Time:* two hours each end.

Precision Performance — Doubled

Here a Norton two-wheel set-up is ready to go into fast grinding action. The job is grinding a double race in a steering gear bearing. *Material:* SAE 1045 steel, 54 Rockwell C. *I.D.:* 1.1507″. *Stock removal:* .012″. *Limits:* +.0000″, —.0005″. *Finish:* 10 microinches RMS. *Time:* 60 seconds.

How Norton wheels add the

"TOUCH of GOLD"

Norton wheels for internal grinding are precision-processed to give them completely uniform structure and identical top performance. There's no fussing with timing cycles when you change wheels. They're extra fast and cool-cutting, extra long lasting — built in sizes and types, bonds and abrasives, to bring the profit-boosting "Touch of Gold" to every internal grinding job.

Ask your Norton Distributor about the G Bond and 32 ALUNDUM* abrasive — the ideal combination for many precision and semi-precision grinding jobs. Or write direct to your nearest Norton district office. NORTON COMPANY, Worcester 6, Mass. Offices in nine cities. Distributors in all industrial areas. Behr-Manning, Troy, N. Y., division of Norton Co. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

Rounding It Out — Fast

During hardening, a certain amount of warpage occurs in this steel mould band. A Norton wheel is grinding it perfectly round and smooth. The band has an I.D. of 6″ and is 4″ deep. Average amount of stock removal is .040″ and the time cycle is 30 minutes.

W-1685

NORTON

ABRASIVES

Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels
Grinding Machines • Refractories

BEHR-MANNING PRODUCTS: Coated Abrasives
Sharpening Stones • Pressure-Sensitive Tapes

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

Spotlight Is On San Francisco

San Francisco's Bay Area is rapidly burgeoning into a leading industrial center . . . $60 million announced for new plants, expansions in January alone . . . Metalworking firms among growth leaders—By R. R. Kay.

◆ METALWORKING MARKETERS' memo! Note San Francisco's Bay Area's rapid industrial growth. It's enough to make your head spin.

The year is off to a thundering start: $60 million announced for new plants and expansions in January alone. Last two years: $400 million.

Forecast . . . Tips on things to come: Industrial expansion will push the Golden Gate wide open. Population by 1960 should hit 4.5 million. It adds up to a steadily expanding market for a wide variety of home, school, office, and factory needs.

Despite the huge influx of industry to the Bay Area—$1.5 billion since end of World War II—the rate of industrial growth lags behind the population surge. People make markets. And markets foster new industries, nurture expansion of existing ones. In the Bay Area since 1940: 1.5 million new customers. And Westerners show little tendency to be jaded by abundance. So it makes real sense for expansion-minded industrialists to take a good, hard look at this spot.

Boon For Metalworking . . . Long heralded as the Farwest's financial capital, San Francisco is now copping new glories as an industrial center. Metalworking and metal producing are right up front.

Today, 60 of the nation's 100 largest corporations have their western headquarters here. And of these top 100 firms, 43 operate 116 manufacturing plants in the region. Look at this list of new plants announced in January: Lockheed Aircraft will spend $22 million, DuPont $15 million, International Business Machines $9 million, Crown Zellerbach and Fibreboard $5 million, Diamond Match $4 million.

And that doesn't include General Electric's huge international atomic power research headquarters to go up in San Jose. Rumored employment, 16,000. An atomic power plant is going up in Livermore. And there's leap-frog growth of electronics plants on the San Francisco Peninsula.

Good News . . . It's reported that primary metal firms here will soon tell their plans for huge expansions. Last year, they shelled out $10 million to improve and enlarge facilities.

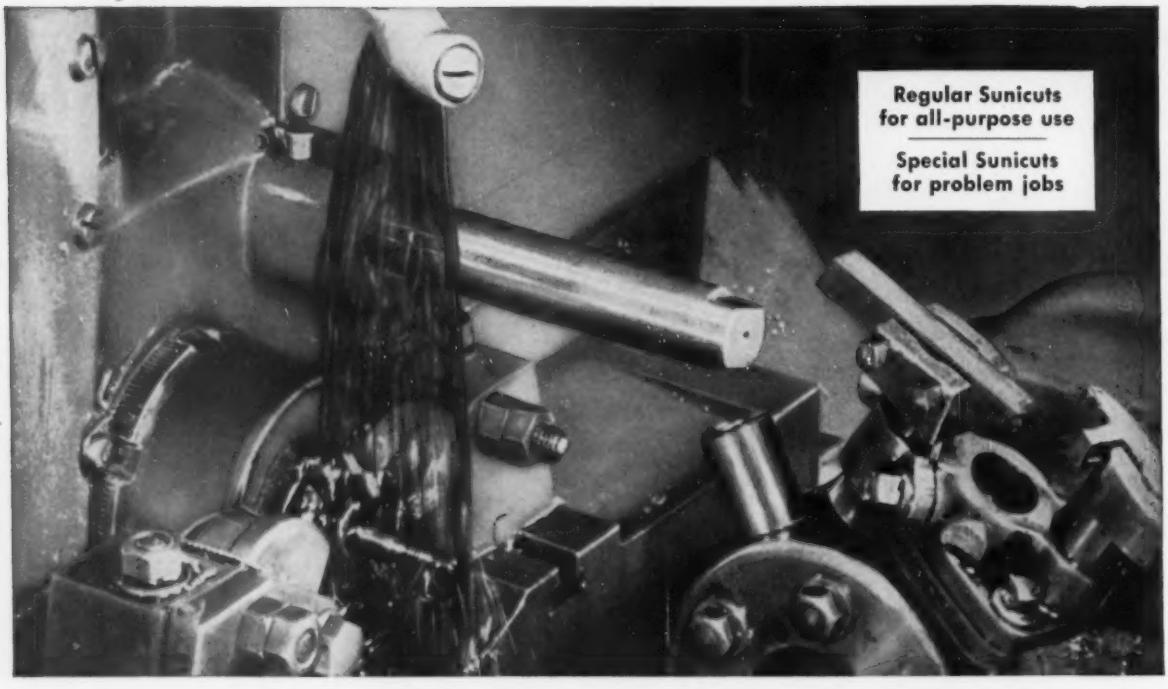
"The boss is putting you in charge of the Portland plant? We have no Portland plant."

These West Coast metal producing giants fly home-office flags over the Bay Area: Kaiser Aluminum & Chemical Corp., and the steel industry's Bethlehem Pacific Coast Steel Corp., Columbia-Geneva Div. of U. S. Steel, Kaiser Steel Corp.

Fabricated metal producers last year expanded to the tune of $7 million; non-electrical machinery manufacturers, $5.5 million; electrical equipment suppliers, $3 million.

Market Notes . . . Some marketing facts and figures: Primary metal firms have 12,400 workers. Fabricated metal industries employ 17,300. They make everything from tin cans to steel barrels. Non-electrical machinery, with an all-time high of 17,100 workers, produce everything from diesel engines to food processing equipment. Over 14,000 workers in the Bay Area, and neighboring Santa Clara County's electrical machinery industry, turn out generators, transformers, wire and cable.

What About the Future? . . . West Coast has 10 pct of the nation's people and about 12 pct of the country's buying power. Yet the Coast accounted for only 8.7 pct of value added by U. S. manufacturing industries. Northern California, with San Francisco its heart, has one-third of the rich market. And the Bay Area is on the median line of West Coast population, finance, industry, agriculture, and commerce.



to assure peak production . . .

THERE'S A SUNICUT OIL FOR EVERY SCREW MACHINE OPERATION

Today's Sunicut cutting oils are the result of years of research and on-the-job testing. And they're versatile, too. In many plants *all* screw machine jobs are being handled by a single Sunicut grade.

For the problem jobs, Sun makes a wide variety of special Sunicut oils, each designed to do the job better.

Your Sun representative has the practical know-how to analyze *your* problems. Working with Sun's experienced engineering staff, he's ready to help you pick the Sunicut oil that will give you the tolerances and finishes you want.

The Sunicut series for screw machines is only part of a large selection of non-emulsifying and emulsifying cutting oils available to help you get peak production at the lowest possible cost.

For complete information about Sun cutting oils see your Sun representative... or write Sun Oil Company, Philadelphia 3, Pa., Dept. IA-3.

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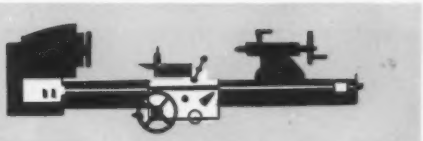


MACHINE TOOL HIGH SPOTS

Why Tool Builders Still Worry

New orders approached $1 billion last year . . . Slight January dip but no real slide . . . But builder warns against optimism, points to heavy investment, stress on special machines—By *E. J. Egan, Jr.*

◆ NEW ORDERS for metal cutting machine tools totaled an estimated $118 million in January as a start toward what the industry hopes will be "a billion dollar peacetime year."

Although new business written last month was not up to last year's November and December figures of $128 million and $158 million, respectively, it still topped the $100 million mark for the fourth month in a row.

But shipments last month dipped to $56.8 million, reversing the recent upward trend in this business barometer. By comparison, December, 1955, shipments were valued at $70.3 million.

Boost Backlog . . . The continuing pattern of a high new order rate and relatively modest shipments keeps pushing the industry's average backlog up. Latest reading taken by National Machine Tool Builders' Assn. statisticians puts this item at 8.6 months as of January 31.

How close did the industry come to a billion dollar year in 1955? Final results show that total new orders fell a bit short of the mark, added up to $967 million. Shipment total was considerably short, came to only $670.4 million.

Lack Full Figures . . . However, these dollar figures pertain only to metal cutting machine tools. New orders and shipments would both show larger totals if the business done by manufacturers of metal forming equipment was added in. But NMTBA does not furnish this information, except to its press-builder members.

Considering the statistics that are available, is the machine tool industry booming, or just doing moderately good business? One analysis of the situation was made by Swan E. Bergstrom, vice president of Cincinnati Milling Machine Co., when he testified at a recent Senate subcommittee hearing on the government's machine tool procurement policies.

Bergstrom told the senators that partly in consequence of last September's Machine Tool Show, new orders improved considerably during the last part of 1955. He then said that the prospect is for a somewhat better year in 1956. "But," he added, "there are some segments of the industry for which this is probably not so."

Why Some Lag . . . Reason Mr. Bergstrom gave is that the large new orders which cause sharp upturns in the industry graphs come chiefly from the automotive firms, with aircraft companies as the next biggest source. He explained that this business calls largely for specialized equipment and that builders of general purpose tools have not shared in it to any great extent.

In his opinion, even the builders of special automotive equipment cannot hope for 1956 volume to match that of 1955 because "the automotive industry has completed a large part of its tooling for most prospective models."

See Greater Need . . . Mr. Bergstrom said that optimistic reports on sales and new orders in the industry must be considered in the light of two other factors. "First," he said, "they must be related to the expanded capacity of the industry and its need for a larger volume of business in terms of its increased investment in plants, machinery and equipment."

"Secondly," he said, "comparisons with sales volume in prior years are misleading." His reasons: (1) they are not properly related to capacity, (2) there is a difference in the value of the sales dollar, (3) there is a substantial difference in the size and complexity of the machine tools themselves.

Bergstrom emphasized that the industry was not plumping for any program to "make work" or subsidies from the government. But he said that in terms of national security it is dangerous and unrealistically optimistic "to think that the machine tool industry will emerge upon a plateau of sustained prosperity. The plain fact is that many companies are not operating near capacity."

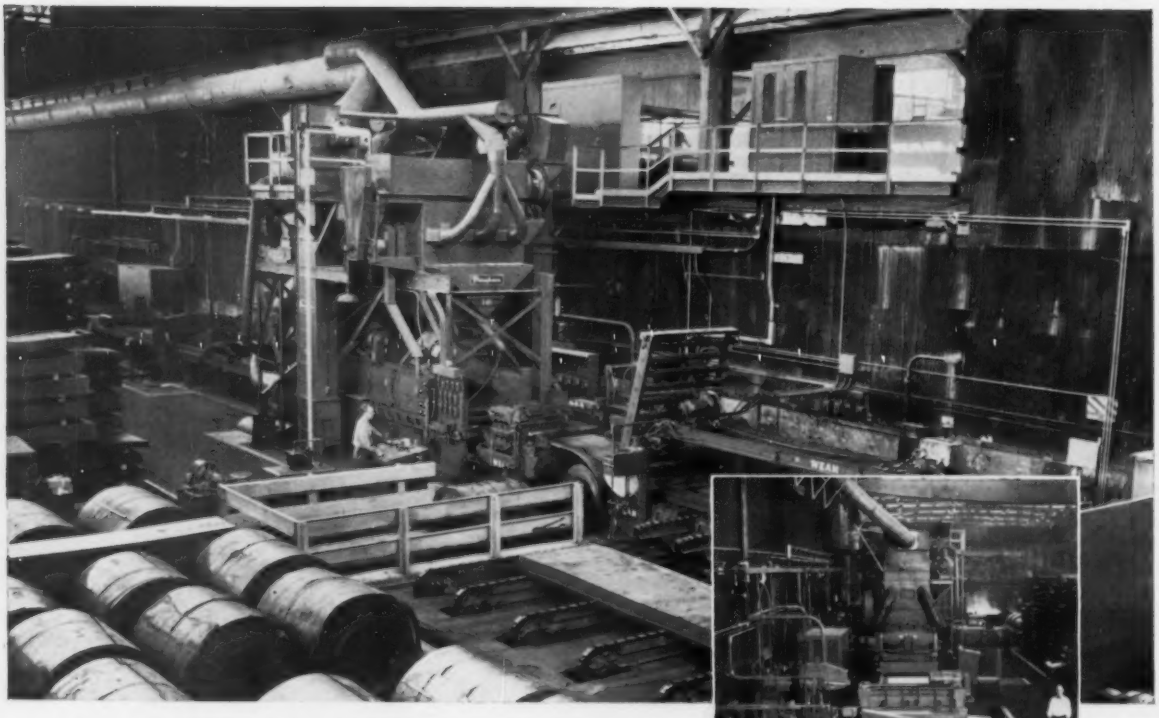
"Creative Selling" will be the theme of the 32nd Spring Meeting of the American Machine Tool Distributors' Assn., to be held at the Hotel Statler, Detroit, on March 19 and 20. Principal speaker will be Ray. H. Sullavan, Ford Motor Co. vice president.

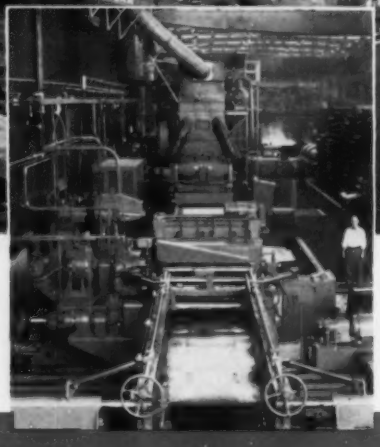
Machine Tools, 1956

(Metal Cutting Types Only)

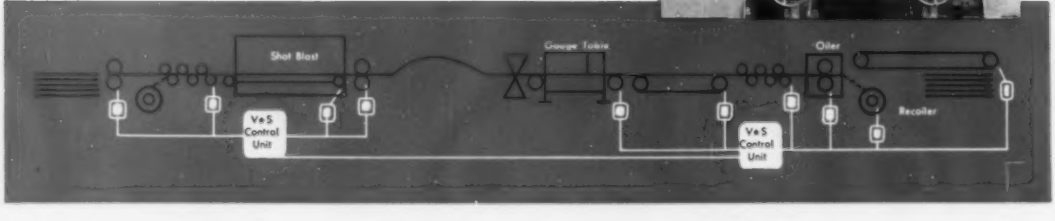
January New Order Index	399.2*
January Shipment Index	191.9*

(*Tentative)





CUTS AND CLEANS UP TO 50 TONS AN HOUR— *Automatically*



It's one of the world's first automotive steel cut-up lines, owned by Parish Pressed Steel Div.—Dana Corp., Reading, Pa. This line cleans, cuts-to-length, lubricates, levels, and coils or stacks up to 50 tons of hot rolled steel an hour.

The line is made up of several separate machines —an uncoiler, a shear, a shot-blast cleaning machine, an unpiler, a lubricator, and a coil winder or stacker —all joined by a conveyor system containing pinch rolls and leveling rolls. Yet the whole line operates as one giant machine, thanks to perfect coordination provided by Reliance V★S Drives.

V★S Drives furnish an unusual flexibility to the Parish line too. Sheet speeds can be varied from 40 feet per minute up to 160 fpm. to accommodate various thicknesses and widths. From the master control, and the three supporting control stations, any one operation or combinations of operations can be eliminated from the line. Thus the line is not limited to just one set series of functions.

This application of Reliance Motors and Drives —to control tension, to synchronize operations, to regulate speed—is typical of the jobs done by the Reliance Applied Engineering Department.

L-1511

If you would like further information on the application of V★S Drives in your plant write:

RELIANCE V★S DRIVE®

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Cleveland 10, Ohio • Offices in Principal Cities

Canadian Division: Welland, Ontario

The Iron Age SALUTES

Wilbert E. Chope

A sound design touch and a sparkling sales flair have enabled him to put electronics to work controlling and checking production in steel and other industries. He built a top company overnight.

Chesterfield's big advertising splash on the use of AccuRay in cigarette packing focused attention on a dramatic industrial story. AccuRay is the trademark of Industrial Nucleonics Corp. The company has come from nowhere to become a top supplier of controls for steel, plastics and other industries.

Driving force behind this rise is a brilliant young engineer-salesman. Bert Chope founded Industrial Nucleonics in 1950. With his brother, Henry, and friend George Foster, he began designing radiation weight or density measuring equipment. From there the company moved into complete process and control systems, using electronic sensing elements.

After the first five units had been built, Bert took to the road. In six months' time, he sold to every major rubber company in the country, bringing back $250,000 worth of business. That was only the beginning. The company moved strongly into steelmaking, installing a cold mill thickness control at Republic Steel, following up with similar applications at U. S. Steel and others. Equipment for inspection, measuring and classifying steel has been provided by Industrial Nucleonics. The company has sold to paper, food, and tobacco plants, has grown to a 300-man operation.

At 32, Bert Chope has behind him amazing business success. In addition, he is chairman of the board of World Neighbors, Inc., an organization that spreads technical knowledge. He has taken part in regular television and radio programs. In 1952 he was named "Man of the Year" by the Columbus Junior Chamber of Commerce.

From the beginning he has been marked as a bright young man. Through high school in Kentucky, pre-war studies at Vanderbilt, engineering studies at Ohio State and graduate work at M. I. T., his progress has been marked by leadership awards, scholarships and citations. He served with the Signal Corps during the war, has played with numerous musical groups, is married to a Cape Cod girl who has gotten him to take up her own hobby of flying.

Here's One of the

Deep Secrets of Bristol Brass

This is a "double-take". For you're looking at the *same* piece of Bristol Brass, before and after. That wide shallow cup becomes that narrow deep tube in *one* progressive drawing operation. Next, it becomes a famous make of flashlight, one of many thousands produced every day.

You see here one of the many reasons why so many enlightened manufacturers "make it out of Bristol Brass". Because whether it's sheet, rod, wire, extrusions or forgings . . . every Bristol Brass mill product *performs to perfection on the job*, according to the fabricator's specifications.

In fact, when *your* specifications are set in the Bristol mill, your material concerns are over. And you can rest easy from there on out, secure in the tradition of "Bristol-Fashion" . . . which means everything correct, shipshape, and on time . . . *every time*. All you have to do, to prove it to your own profit, is call Bristol, Connecticut, Ludlow 2-3161.

. . . and for Brass FORGINGS, too . . . get them from

ACCURATE BRASS COMPANY

(*Division of The Bristol Brass Corporation*)

now in a new and modern plant at Bristol, Connecticut

THE BRISTOL BRASS CORPORATION

has been making Brass strip, rod and wire here in Bristol, Connecticut since 1850, and has offices and warehouses in Albany, Boston, Buffalo, Chicago, Cleveland, Detroit, Milwaukee, New York, Philadelphia, Providence, Rochester, Syracuse. The Bristol Brass Corporation of Ohio, 1607 Broadway, Dayton.

"Bristol-Fashion" means **Brass at its Best**

The Iron Age INTRODUCES

ROBERT B. HEPPENSTALL, elected president, Midvale - Heppenstall Co., Nicetown, Pa.

JOHN P. ROCHE, elected vice president, Midvale - Heppenstall Co., Nicetown, Pa.

HARRY W. DAVIDSON, elected vice president, Midvale-Heppenstall Co., Nicetown, Pa.

DAVID D. WALLACE, elected vice president, Clearing Machine Corp., Chicago.

Adolph F. Leitner, elected executive vice president, **Ralph C. Coxhead Corp.,** Newark, N. J.

Arthur W. Kennedy, named superintendent, rough ring production, **American Welding and Manufacturing Co.,** Warren, O.; **R. E. Goodman,** named superintendent, finishing operations.

Alfred M. Goodman, named supervisor, quality control, **Acme Steel Co.,** Chicago; **J. Robert Sansom,** appointed manager, distributor sales, Dexion Div.

Edwin A. Yeo, named manager, larger office, Chicago, **Leeds & Northrup Co.,** Philadelphia; **Willard H. Neu,** named manager, Pittsburgh; **Manley S. Nolen,** named manager, Cincinnati; **Thomas C. Bennett,** appointed technical assistant, resale, Philadelphia.

Dean R. Webb, appointed supervisor, general chemical sales, Cincinnati office, **Dow Chemical Co.,** Midland, Mich.

Benjamin H. Danziger, appointed manager, advertising and promotion, **Climax Molybdenum Co.,** New York.

S. C. Massari, appointed director, research, **National Engineering Co.,** Chicago.

Robert L. Nelson, appointed sales analyst, Products Div., **Greer Hydraulics, Inc., Jamaica,** N. Y.

Dr. Bruno Jeremias, named chief research chemist, Research and Development Dept., **Wagner Bros., Inc.,** Detroit.

Lawrence P. Baker, named sales manager, **The Stanley Works,** New Britain, Conn.; **Marshall A. Pease,** named director, new products development, Pressed Metal Div.; **Porter B. Clapp,** named sales representative, Chicago office, Steel Strapping Div.

W. T. Cushing, Jr., appointed manager, industrial sales, **The National Supply Co.,** Pittsburgh.

Robert E. Kelley, named manager, finance, Gear Motor and Transmission Components Dept., **General Electric Co.,** Paterson, N. J.; **Robert L. Spitler,** named manager, manufacturing; **Ralph E. Coutant,** named manager, engineering; **Howard W. Arnold,** appointed manager, distributor sales, Detroit.

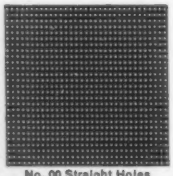
Kevney O'Connor, Jr., appointed sales manager, Aircraft Product Div., **Cooper Alloy Corp.,** Hillside, N. J.

Walter E. Baker, Jr., named sales manager, Pittsburgh, **Universal-Cyclops Steel Corp.,** Bridgeville, Pa.

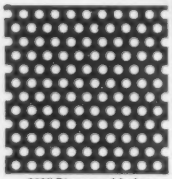
William G. Eikenbary, named distributor sales manager, **The Ferry Cap and Set Screw Co.,** Cleveland; **Albert F. Hoecker,** named quality manager.

Perforated Materials for *Every* Application

Contact H & K for any perforated materials your product may require.



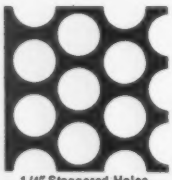
No. 00 Straight Holes
952 holes per sq. in.
.020" diam. 30% open.



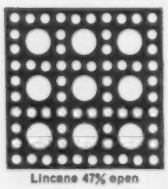
.060" Staggered holes.
126 holes per sq. in.
3/32" centers. 36% open.

We have tools for perforating thousands of different patterns.

We will be glad to work with you on your perforating problems.



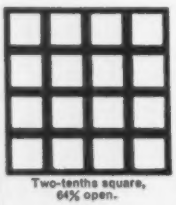
1/4" Staggered Holes.
5/16" centers.
.25" diam. 58% open.



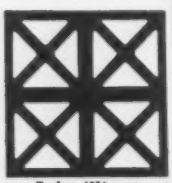
Lincane 47% open

See our catalog in Sweet's Product Design File.

Perforating all metals, Masonite, plywood, paper, cloth and plastic.

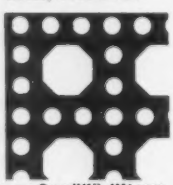


Two-tenths square,
64% open.



Perlex 40% open

Round holes, square holes, slots, ornamental patterns, oblong holes, oval holes.



Cane "41" 41% open.

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5619 Fillmore Street
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- ☐ STOCK LIST of Perforated Steel Sheets
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TITLE_____

COMPANY_____

STREET_____

CITY_____ ZONE_____ STATE_____

John D. MacNamara, appointed field sales manager, **Weston Electrical Instrument Corp.,** New York.

John P. Moffat, Jr., appointed assistant director, quality control, **Consolidated Electrodynamics Corp.,** Pasadena, Calif.; **Francis T. Greenup,** named assistant chief product engineer; **Gerald P. Foster,** named chief, services section, Systems Div.

Deane Courtright, appointed district sales representative, Leshen Wire Rope Div., **H. K. Porter Co., Inc.,** St. Louis.

Joseph W. S. Davis, named regional manager, western region, **Alco Products, Inc.,** Chicago.

George W. Evens, named works manager, **La Salle Steel Co.,** Hammond, Ind.

Richard J. Donnelly, appointed manager, labor relations, **Clark Equipment Co.,** Buchanan, Mich.

Erich Gobien, appointed general methods engineer, **Kurt Orban Co., Inc.,** Jersey City, N. J.

Gilbert S. Wright, appointed chief engineer, Press and Special Machinery Dept., A. B. Farquhar Div., **Oliver Corp.,** York, Pa.; **Paul J. Chaney,** appointed sales manager.

Thomas B. Clark, named district sales representative, Cleveland office, Hamilton Press Div., **Baldwin-Lima-Hamilton Corp.,** Hamilton, O.

Joseph N. Gaus, appointed hydraulic engineer, **Mannesmann-Meer Engineering & Construction Co., Inc.,** Easton, Pa.

John W. Smith, appointed sales representative, Detroit Office, Hamilton Press Div., **Baldwin-Lima-Hamilton Corp.,** Hamilton, O.

Omer W. Nichols, appointed project engineer, **Kennametal Inc.,** Latrobe, Pa.; **Karl G. Niskanen,** named assistant process engineer.

THOMAS M. BUTLER, elected director, engineering, Burroughs Corp., Detroit.

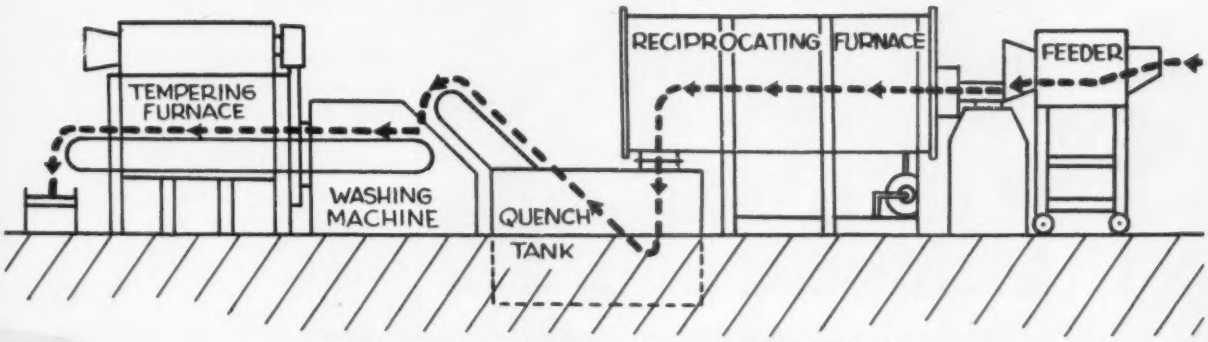
FRANK J. GRUMBACH, appointed district sales manager, Cleveland, Republic Steel Corp.

HOWARD COOPER JOHNSON, elected assistant to chairman, U. S. Steel Corp., New York.

J. W. SMITH, appointed Eastern sales manager, Industrial Products Div., Goodyear Tire & Rubber Co., Akron, O.

NOW

AUTOMATIC HEAT TREATING



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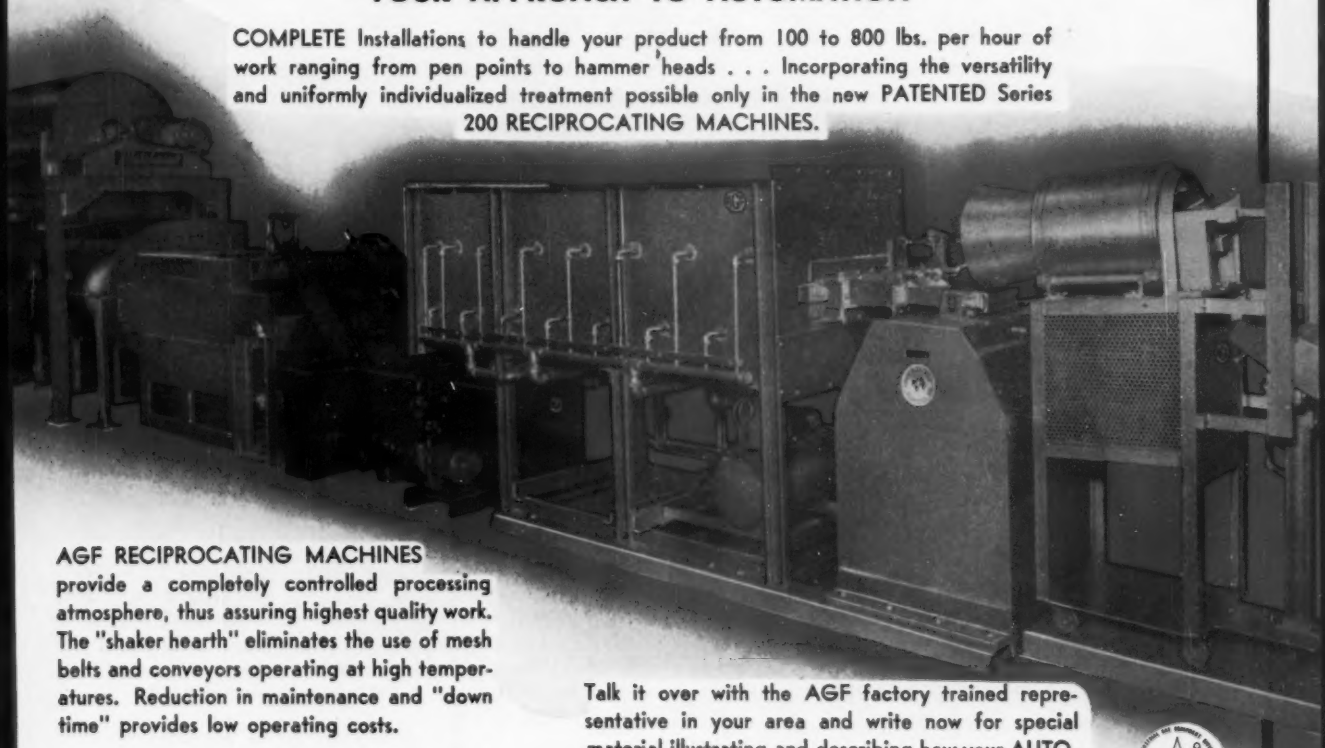

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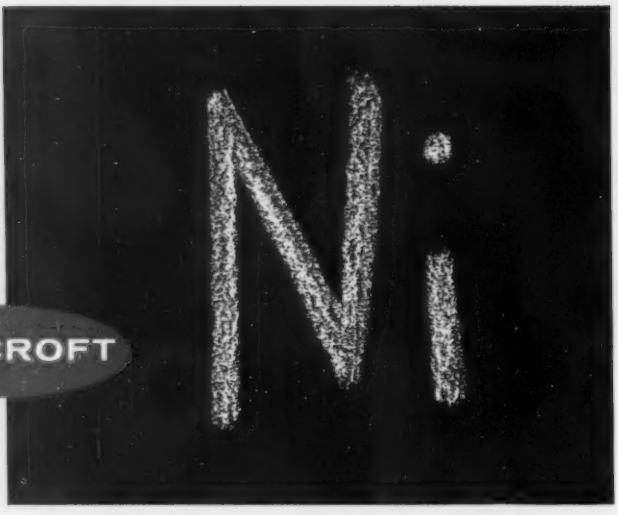

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Melvin Larson, appointed research chemist, Research Lab., **Climax Molybdenum Co.,** Detroit.

Robert H. Miller, named purchasing agent, **Cooper Alloy Corp.,** Hillside, N. J.

Walter W. Thoryk, appointed carbide metals representative, Ohio and Western Pa., **Wesson Metals Corp.,** Lexington, Ky.

John Porter, appointed sales representative, New England District, **Baldwin - Lima - Hamilton Corp.,** New York; **George E. Mansen,** appointed district sales representative, Chicago, Hamilton Press Div., Hamilton, O.

C. P. Whiteley, appointed regional application engineer, **Automatic Transportation Co.,** Chicago.

Jack White, appointed assistant sales manager, **Colonial Broach & Machine Co.,** Detroit; **Donald Robertson,** appointed purchasing agent.

Robert H. Egan, appointed division industrial engineer, Berger Div., **Republic Steel Corp.,** Canton, O.

Herbert Wolf, appointed chief engineer, research and development, Air Conditioning and Refrigeration Div., **Worthington Corp.,** Harrison, N. J.

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FEATURE ARTICLES

Simple as A, B, C—

Channel Struts Make Short Work Of Construction

◆ A system combining (1) standardized construction, (2) precision formed interchangeable parts and (3) simplified assembly, is achieving some startling results on new construction projects . . . Moreover, it gives more mileage out of a pound of steel.

◆ Roll-formed members are assembled on the job without any fitting in less than one-third the usual time . . . Yet costs are no higher than for conventional construction . . . Building materials can be salvaged almost 100 pct.

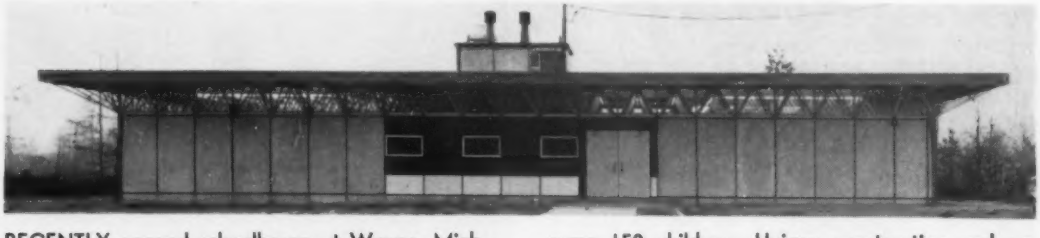
By W. G. PATTON, Engineering Editor

◆ BUILDING construction, normally taking many months, is being cut to a fraction of the time by a simplified system. Using this system, a 6000-sq ft school building in Wayne, Mich., accommodating 150 children, was framed in less than 30 days and completed in about 90. Interchangeable parts, unique frame spacing and on-the-job assembly methods were used.

Among its more outstanding features are:

1) No drilling, fitting or welding was required on the job, the entire building being put together like a Meccano set with precision-rolled steel channels, standardized fittings and bolted construction.

2) No basement or foundation work was required. The building rests on 74 cement pads



RECENTLY opened schoolhouse at Wayne, Mich., was completed in about 90 days to accommodate some 150 children. Unique construction and on-the-job assembly methods speeded project.

READY FOR ROOFING, building gets final framing touches. After panels are all in place, dirt is refilled into hole nearly to floor. Tests show joint strength of this construction equal to welding.

4 in. thick, which are laid on leveled ground covered by a layer of gravel.

3) Weight of the building is less than one-fifth that of conventional school structures. A large proportion of the total weight of the entire building is steel.

4) Asbestos cement panels used for walls, roof and floor fit snugly into place, requiring sealer for only one sidewall joint.

5) Acrylic windows (better heat-retention and breakage resistance) replace glass 100 pct.

6) The entire building could be moved by sections in a few hours to a new location or completely disassembled, yet salvaging almost all materials.

The well-insulated heating plant of the new building is located on the roof. Heat feeds downward through a 4 sq ft duct into the open under-the-floor area, and is distributed through openings in the window sills. Utilities are grouped in the center of the fire-resistant, rot-proof building, for greater accessibility and minimum installation expense.

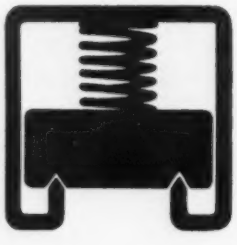
The building actually rests on a series of jackscrews, supported by steel locating plates set into the concrete pads. After assembling the extensively cross-braced steel construction which supports the floor, the jackscrews can be leveled in a few hours with the aid of surveyors instruments. Next step is to bolt the studs in place.

Little sealer required

Framing of the roof comes next. Asbestos cement panels are battened in place to channels for the floor, the walls and the roof. Partly because of the generous overhang, no sealer is required on the side walls except at the floor line of the building.

Steel channels and fittings go together on the job like parts being assembled on an automobile assembly line. Fits are assured by precision forming of the steel channels in the roll-forming machines at the nearby Unistrut plant. In contrast to conventional construction, overall dimensions of the building are held within a few thousandths of an inch.

Unistrut standardized connections provide adequate strength without welding. Tests show joint strength to be equal to that by welding.



SIMPLICITY of Unistrut framing system is illustrated by this typical cross-section of continuously slotted channel into which spring nut is inserted and given a quarter turn. Only a bolt and wrench are needed to finish the job.

Channels have a continuous slot and wedge-shaped inturned edges to take the serrated grooves of the patented Unistrut nut. The serrated grooves bite into the inturned edges of the channel, providing positive clamping. Nuts, with a spring attached, fit anywhere along the channel. Rounded edges of the nuts permit easy insertion at the desired location. The spring holds the nut in position for bolting.

Unistrut officials explain that getting more work out of a pound of steel involves more than strong, well-braced construction using precision-formed steel members and simple joining techniques. Design of all plates and fittings must be completely standardized and thoroughly proven in the laboratory and field.

Recent ventures into complete buildings was preceded by more than 16 years' experience with Unistrut for electrical switchgear and transformers, shelving and other types of interior construction for industry. The Wayne school is the fourteenth complete building to use Unistrut.

Flexibility of construction and the use of well-braced, light members assures proper load distribution. Length of the standard channel is only 4 ft, and 12 to 19-gage steel is used depending on the span. All channels are Bonder-

ited. Nuts and many fittings are zinc-plated where corrosion would be a factor. Several channels may be joined or spot-welded at the factory. Cranes are not needed since a hoist can raise roof panels.

Tests show that where heavy loads are imposed, the short Unistrut sections tend to act as individual members, bowing slightly, for example, but leaving the overall shape of a long span relatively unaffected. Similarly, the expansion and contraction effects of heat and cold are minimized.

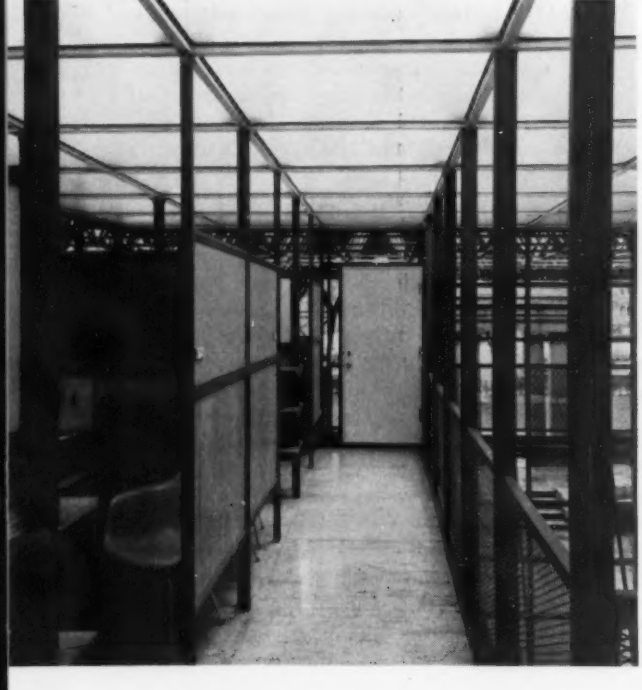
While the cost per pound of the precision-formed members, together with the relatively large quantity of steel used, results in considerable expense, total costs are low because of the relatively big savings in assembly. The new Wayne school building was built at less cost than the lowest-cost school building in that area.

Similarly, while the cost per pound of asbestos skin panels is relatively high, again this is offset by low on-the-job assembly expense. Another favorable factor is the low cost of installing plumbing and electrical utilities, and attaching shelving.

The unusual flexibility of Unistrut construction is particularly valuable in installing partitions throughout the building. Partitions can be changed at any time, merely by removing the panels, unbolting the connection and moving or inserting panels at the new location.

CLOSEUP of jackscrew plate assembly shows detail of how angular bracing is joined to plate. This type construction produces excellent rigidity as well as speed of erection.

PROTOTYPE of Wayne school was this architectural research building erected at University of Michigan in 1949.



Low maintenance cost is another advantage. Outer asbestos cement panels remain unpainted throughout the life of the building. Cheerful colors are used in the interior. These seldom require repainting, and standard size panels can be changed or repainted within a few hours if desired. Nearly all materials are finished as delivered at the building site, saving a great deal of construction time.

Development work on the use of Unistrut for complete buildings started as a research project at the University of Michigan School of Architecture and Design in 1949. Framing members are supplied in 7 basic sizes, ranging from a channel section 13/16 x 13/32 in. to a channel section measuring 1⅝ x 2 7/16 in. Various combinations of these channels can be welded together to form a larger member of any desired length.

Full size research model

The Architectural Research Building at University of Michigan served as a full-scale research model for the Wayne building. It was used experimentally to check various design and structural arrangements, including lighting, color, acoustical characteristics and heating. Visiting architects, engineers, school administrators and teachers contributed many valuable suggestions incorporated into the later building designs. Many of these emphasized the changing nature of school districts and of school population, as well as the constant need for rearranging or adding to the school plan.

In addition to the standard steel framing members, principal items used are asbestos

cement panels and low-transmission acrylic panels. Fiberglas is used for insulation. Walls are 4 in. thick, compared with conventional 8 in. brick walls. There is no trimming, sawing or fitting in the field.

Standard asbestos cement panels 48 in. x 96 in. are used. An extra inch (⅞ in. for the channel slot and ⅛ in. tolerance) is required. This 49-in. module is used throughout the structure.

Sidewall studs are placed 49 in. apart, and join the floor framing at floor height. Studs carry all roof loads.

Every 49 in. of floor is supported by floor posts. The lower floor beams rest on jackscrews as required on 49-in. modules. As soon as the floor framework is assembled and leveled, the ¾ in. thick asbestos cement panels with rabbeted edges are laid over the floor beams and joists and fastened with battens. A floor of this type will support the normal loads required by building codes.

A skirtboard of asbestos cement, applied to the lower portions of the outside walls, closes off the space under the floor and thus permits its use as a plenum for warm air heating and for ventilating the building. Rubber, linoleum or plastic tiles are laid over the floor panels.

Generally, construction of the roof section follows the plan used for the floor framing. Each truss projects a full module and a half beyond the sidewall. The overhang helps keep direct glare out of the schoolrooms. Diagonal struts carry tension stresses from the roof overhang down to the studs at floor level.

Since all roof loads are carried by the sidewall studs, the sidewall panels merely act as a curtain against the weather. Side panels are either ⅜ in. thick asbestos cement boards or Plexiglas. The lower part of the Acrylic panels is smoked to minimize glare. Sheets of Fiberglas, inserted within the wall, provide insulation.

No condensation problem

Experience shows there is little evidence of condensation when this construction is employed. If condensation should develop, nonmetallic strips can be inserted between the exterior battens and the stud slots.

Partition studs are anchored to the floor framework below and to the bottom chords of the roof trusses. Crossbraces are attached to the partition studs at door height and at baseboard level. Standard panels of asbestos cement are fastened with snap-on or screw-on battens. The asbestos panels can be surfaced with cork sheeting or left plain.

The open grid created by the lower chords of the roof trusses is covered with a thin translucent film. Instant-starting neon lights diffuse a strong, shadowless light through the film and throughout the entire room. Windows extend from the ceiling to only 18 in. above the floor.

CEMENT PADS which provide necessary footing for the building are here poured into coated cardboard boxes. Note inserts for jackscrews.

Electrical service is brought directly into the attic space. Channels in the framing members of the roof truss chords, as well as in wall and partition studs, serve as conduit for wiring linking the various rooms.

A warm air convection heating system is employed. Passage of the heated air through the underfloor plenum helps to keep the floor radiantly warm. A fixed percentage of the air is recirculated; the rest is exhausted by a fan located in a roof overhang panel and is replaced with fresh air.

All pipes and water lines run through the underfloor plenum where they are easily accessible. Pipes are held in place by straps connected to the floor beams and joists. There is no danger of freezing in this heated area. Experimental work with plastic pipes has been carried on to a limited extent.

Many plan variations of Unistrut school construction are now being studied, including variations in length, width, site grouping and variable interior arrangements. The method lends itself ideally to the use of movable partitions.

Major emphasis thus far has been placed on cutting down assembly time in the field. Trained construction crews are not required. At Wayne, a field crew of a few men, using only electric impact wrenches, rubber-headed mallets and screwdrivers, erected the entire structure.

The Company plans to build several additional school buildings, and is considering plans for warehouses, small industrial buildings, airport shelters and other similar projects.

Easy and economical—

◆ Good cleaning only reduces the possibility of joint corrosion due to residual or entrapped flux in soldering, brazing and welding of aluminum . . . Most techniques avoiding flux require special procedures or equipment.

◆ Recently developed self-fluxing aluminum solder by-passes all these problems, joins easily and economically at low temperature . . . Presence of aluminum oxide surface film can be ignored . . . Compatible zinc-lead blend bonds securely with parent metal.

ALUMINUM foil cellular sandwich is soldered without burn-through. Little skill is needed.

Fluxless Aluminum Joining Avoids Joint Corrosion

By SAMUEL FREEDMAN, General Manager, Chemalloy Electronics Corp., Santee, Calif.

◆ ALUMINUM castings, sheet and even foil can now be easily and economically joined or repaired without fluxing. Special cleaning, surface preparation, or removal of the aluminum oxide surface film is not needed. Relatively unskilled operators perform the operation with minimum danger of burn-through.

The noncorrosive joining material is a zinc-lead blend that in one form develops tensile strength in excess of 50,000 psi, yet melts at 800°F or lower. It is suitable for bonding aluminum, and apparently its full range of alloys as well. Heat-treatable aluminum alloys may be joined with less damage to developed properties, due to the relatively low temperatures required.

Fluxless joining of aluminum has long intrigued metalworkers, just as need for flux has annoyed them because of the possibility of corrosion in joints and adjacent metal. Two methods avoiding flux are currently in known use. Both require special equipment. Both pay special attention to removal not only of foreign matter, but also the tenacious aluminum oxide surface film. This film melts normally only at temperatures sufficient to melt aluminum itself.

In joining with the zinc-lead blend, presence of aluminum oxide is ignored. Surfaces should be clean, although this preference is not critical. Heat just sufficient to melt the joining material is applied to mating aluminum faces.

" . . . Sound joint is assured, since the blend pentrates surface oxides and bonds from metal to metal . . . "

Solder rod is flowed on and spreads immediately between joints by capillary action. A sound joint is assured, since the Zn-Pb blend appears to actually penetrate surface oxides and to bond from parent metal to parent metal.

One earlier method of fluxless soldering employs ultrasonics to shatter the aluminum oxide film at the time of heating (THE IRON AGE, June 24, 1954, p. 97). Inert-gas metal arc welding of aluminum also needs no flux. But the Al_2O_3 coating normally is removed mechanically or chemically. This operation is particularly essential in arc welding heat-treatable aluminum alloys, or alloy parts that have been severely formed.

Other aluminum joining techniques require flux to dissolve the oxide film which otherwise prevents consistently sound bonding. Most if not all aluminum fluxes contain corrosive chlorides and fluorides. Residual and entrapped flux attacks and weakens the aluminum joint in the presence of moisture.

Best cleaning efforts to date still include the possibility that some flux may not have been removed. In some cases, this possibility has dictated a costly design change to avoid the necessity of a joining operation.

Vaporizes without warning

Joining aluminum also is complicated by the metal's lack of color change in heating. Contrary to the behavior of many other metals, there is no advance indication that is is approaching the melting point—until aluminum suddenly disintegrates or vaporizes.

At Chemalloy Electronics Corp., a joining problem developed in connection with brazing 24ST flanges to 2S aluminum tubing. Dimensional tolerances in fabricating microwave radar waveguides were to be held to 0.002 in.

Zinc and lead were found to solder aluminum satisfactorily. But low solubility of lead in zinc ordinarily causes the heavier metal to precipitate at the grain boundaries on cooling. Embrittlement of the alloy results. On reaching room temperature, the zinc base material even with a few percent lead tends to disintegrate, even powder.

The problem is not new, and became known earlier in connection with Kirksite dies. This predominantly zinc alloy tends to crack with as little as ½ pct lead contamination.

Muriatic or hydrochloric acid was found to promote miscibility of lead and zinc. When added directly to the molten alloy, it naturally initiates an explosion. Several laboratory incidents involving scattered molten metal were convincing evidence that acid cannot be added directly, even in minute drops.

One satisfactory solution calls for use of a highly porous vehicle. Less than ½ pint of acid per 150 lb of metal is introduced via the carrier, in the form of a mud or paste mix. When the acid paste is blended with molten zinc and lead at temperatures as high as 1500°F, the reaction continues to completion without danger.

What otherwise would be a violent, near instaneous, single explosion becomes a five minute heavy boiling of the metal. Miniature reactions develop uniformly throughout the molten metal in the crucible. Up to 18 pct lead has been blended with zinc using this technique.

Acid boils off

On completion of the reactive cycle, the carrier material again becomes porous and rises to the surface. There it is skimmed off with other impurities and residues. The muriatic or hydrochloric acid volatilizes in the reaction, except possibly as trace elements.

Resulting material is noncorrosive chemically and galvanically. In salt spray tests continued beyond 2000 hours, neither joint nor adjacent metal corroded. Tests employed a 20 pct salt solution.

Self fluxing nature of the material may arise from chlorides introduced in the acid blending operation. If so, salts present presumably are too dispersed to initiate corrosive action.

Application of the Zn-Pb blend in joining aluminum always is elementary. Heat applied to aluminum should be no more than necessary to melt the filler metal. It should be developed over a few seconds, rather than a shorter time. Any heat source producing the desired temperature is suitable, but a minimum torch flame without halo is most satisfactory.

Propane torches seem best adapted for light aluminum work, although oxyacetylene torches are frequently employed. Flame on the latter should be cut back in intensity so as not to reach the blend's melting point immediately. In all cases, both surfaces to be joined are heated, and not the zinc-lead rod.

Penetrates oxide film

Molten Zn-Pb blend deposited on the heated parent metal penetrates the surface oxide by what appears to be capillary action. If heat is immediately removed, a solder-type bond results. If heating is continued then capillary action becomes visible in the form of a slight uplift of the skin on the parent metal. The longer heat is directed at the molten zinc-lead blend, the greater distance the alloy travels from the point of maximum heat.

This results in a very desirable situation. With other joining methods, prolonged heat

often results in burning a hole in the aluminum. In the case of the blend, longer (though not more intense) heat merely expands the area of capillary action and results in more complete bonding. For this reason, novices can (and have) turned out better joints than experienced welders accustomed to working at higher temperatures.

The material can be blended in numerous proportions for various properties, as shown on the accompanying table. The 500°F blend is used in soldering aluminum foil and thin gauge sheet, where the least possible heat damage is desired. The 600°F blend is an effective compromise containing aluminum for a finer grain structure.

Copper in the zinc-lead blend increases tensile strength, as demonstrated in the 800°F blend shown in the table. It also slightly darkens the filler metal. Aluminum also is added, again to promote a finer grain structure.

In destruction tests of 75S alloy joined with the 800°F material, the parent metal parted before the bond. This aluminum alloy is rated up to 76,000 psi tensile strength.

Addition of silver results in slightly better quality. However, it is used only in custom blends as standard alloys are adequate and more economical.

In joining the purer aluminums, such as 2S and 3S, blends devoid of copper are easier to apply. With the alloys 24ST through 75S, all blends are satisfactory.

The product has been used to successfully weld or repair potmetals and zinc. A 500°F or 600°F blend is used with these metals, because of their low melting point.

The material also adheres to galvanized coatings and to aluminized steel, such as that supplied by Armco.

Soft solder adheres readily to surfaces tinned with the zinc-lead blend. Copper may thus be readily attached to aluminum without flux touching the latter metal.

All solder blends can be polished, plated and machined without coolant. Lathe cuttings come off as a fine powder that does not irritate or cut the skin. Dry bearing or anti-friction properties of the material permit it to withstand chafing without appreciable heat rise. It resists chemical reaction when immersed in most liquids, except the more violent chemicals. Liquids normally behave as a protecting lubricant instead of a corroding agent.

Personnel require no special skill or training to solder with the material. It does not shatter or explode. Colored glasses, welding hood or special clothing are not necessary. No sparks or intense light develop.

ZINC-LEAD alloy microstructure of joint magnified 100 times shows bonding action.

Typical Self-Fluxing Aluminum Solders

Melting point, °F	Zinc, pct	Lead, pct	Tin, pct	Aluminum, pct	Copper, pct	Tensile strength, psi (approx)
500	90.0	7.0	3.0	—	—	10,000
600	87.0	5.6	2.4	5.0	—	25,000
800	85.0	1.4	0.6	8.0	5.0	50,000

SELF-FLUXING ZN-PB ALLOY, JOINS, REPAIRS

aluminum and aluminum alloys
zinc and zinc alloys
potmetals
galvanized sheet
aluminized steel
copper to aluminum

Foolproof System Doublechecks Inventory

- Trouble-free inventory still is a dream in most plants, yet the reality may be a lot closer and simpler than most realize . . . Here's one low-cost approach.
- Double check of each count makes for the highest accuracy . . . Responsibility for miscounts also is pinpointed without reflecting on the ability of the checker.

By **HARRISON YOUNG**, Management Engineer, Systems Council, New York City

◆ INVENTORY time again—and it arrived while you still were recovering from the last. In 1956, try this highly accurate yet simple and foolproof system already in successful use by a few metalworking plants. Inventory is finished in one day, minimizing lost production time. A double check pinpoints responsibility for any errors.

Even with the most efficient plant accounting system, everyone agrees on the need for reconciling book inventory records against a physical check of materials actually on hand. Two different inventory methods are widely used. One covers all storage areas in the course of a year by checking stock on a different section of floor each successive week. The other does the whole job at one time.

Advantage of the second is in giving an accurate picture of the over-all situation, so all records can be reconciled simultaneously. Traditional objection to taking physical inventory of the whole plant at once is that it interferes with production, often for several days.

This method for taking inventory in a single day was perfected by G. H. Kline, a top accounting executive with the General Foods Corp. It was developed over a period of years for a number of large and small firms in the automotive, aircraft, electrical appliance and farm equipment industries. There is no reason why the system can't be applied in any industry.

The complete procedure embraces only 12 simple steps:

1. Draw an easily understood diagram of

INVENTORY TAG CONTROL SCHEDULE

Prepared By _____ Date: _____

BUILDING	INVENTORY LOCATION NUMBER	ASSIGNED FOREMAN	ASSIGNED ACCOUNTANT	PRE-NUMBERED INVENTORY TAGS CHARGED OUT	NUMBER OF TAGS CHARGES OUT	TAGS RET'D SPOILED OR VOIDED	SIGNATURE OF ACCOUNTANT RECEIVING TAGS
C&C Basement	B-1	Smith	Fletcher	001-075	75		
	B-2	Black	Fletcher	076-150	75		
C&C 1st Floor	PR	Parker	Martin	151-300	150		
C&C Warehouse	W-1	Burns	Hogan	801-900	100		
No. 2 Warehouse	A-1	Mapes	Long	901-1050	150		
Yark (Skids & Drums)		White	Long	1051-1100	50		

FIG. 2—(Above) **Tag control schedule specifies individuals given prenumbered tags. All tags are charged out to a specific supervisory team that later distributes them to counters.**

FIG. 1—(Left) **Inventory count tag supplies two tear-off sections, both of which are turned in.**

each floor area to be inventoried. Have sufficient maps duplicated so each of two counting teams has a copy for that section of floor they cover. Each supervisory team also gets a copy. You'll need extras too, in case some are mislaid.

2. Divide manpower available for the actual counting into two-man teams. Draw up an assignment sheet showing the areas each team is to count. Each area is thus counted twice by different teams. This double checking makes for accuracy.

3. List all classes of items to be counted in each area. Indicate how each class is to be recorded: lb, bbl, doz, gal, etc.

4. Select a two-man team to supervise counting in each area or group of areas. Usually each supervisory team consists of the foreman who supervises that section of the plant and an accountant to work with him.

5. Get a supply of patched system tags similar to those of Fig. 1. On separate tags record the quantity of each different class of material found stored in each separate inventoried area. These tags should be prenumbered in sequence by the tag manufacturer.

6. Give to each supervisory team enough tags for the counting teams assigned to the area under the supervisory team's direction. Record those tag assignments by numbers on an Inventory Tag Control Schedule, such as shown in Fig. 2. Explain to all inventory personnel that every tag issued must be strictly accounted for.

7. Prepare and issue lists of counting instructions for the guidance of each supervisory team and for all counting teams assigned to the inventory check.

8. Hold a meeting with all supervisory teams. Go over your typed or mimeographed counting instructions word for word. Clear up any questions then, not later.

9. See that your supervisory teams then hold a similar meeting with their respective accounting teams.

10. As early as possible on inventory day, start actual count. If the quantity of tags assigned to a supervisory team for distribution to its counting teams is insufficient, do not permit borrowing of tags from other teams. Insist that additional tags be obtained from a central control, so tag numbers may be properly recorded on the Inventory Tag Control Schedule.

11. The first counting team counts an area and attaches a tag to each pile or bin checked. It fills out the lower section of the tag, tears off the first stub and hands it in to the supervisory team for the area. The second counting team records its inventory figure on the second section of the tag, tears this stub off and turns it in to the supervisory team. The supervisory team then matches numbers on both tag stub sections.

12. The accountant on each supervisory team checks the inventory figure on each tag stub turned in by the second team against the figure on the corresponding stub turned in by the first team, and reconciles any variations. No erasures should be made on these stubs. Any figures the accountant determines should not be used should merely have a line drawn through them.

The accountant may also classify the nature of the material inventoried by a symbol on the tag recording the first count. In this way, raw material, material in process, and finished goods may be differentiated.

All adjustments in figures are made on tag stubs used for the first count. Thus only these stubs need be considered in the final tabulation by the accounting department.

Prolong fatigue life—

Tests Probe Limits of Controlled Shot Peening

◆ Shot peening can make an important contribution to improving the fatigue life of metals . . . It can also provide a surface finish which reduces the chances of part failure.

◆ But shot peening isn't infallible . . . It can be misapplied . . . Knowing the "do's" and "don'ts," helps make your shot peening operations more effective, more profitable.

By WESLEY W. SAFEE, Development Metallurgy Div., Wright Aeronautical Div., Curtiss-Wright Corp., Wood-Ridge, N. J.

◆ SHOT PEENING—as a means for improving fatigue life of metals—has been gaining in popularity for the past two decades. This trend is confirmed by the steady climb in peening equipment sales. More and more industrial users are learning how profitable peening can be in extending the life of their products.

Behind the trend is the fact that shot peening offers certain proven advantages. But quite a few of the overall effects of shot peening have not been adequately measured. Not all of these effects can be readily generalized without running the risk of serious misinterpretation.

Some of the unanswered questions regarding the effects of shot peening on fatigue life are fundamental in nature. For example, can shot peening *decrease*—as well as *increase* fatigue life? How does initial surface finish influence the effects of shot peening?

These, along with other basic questions, were explored in a recent series of tests conducted by the Wright Aeronautical Division, Curtiss-Wright Corp., Wood-Ridge, N. J. The answers are especially vital to the aircraft designer. But they apply equally as well to all applications of shot peening where improvement of fatigue life is the prime objective.

Both surface finish and part geometry contribute significantly to the fatigue life of all metal parts. They are the limiting factors controlling a potential increase in fatigue life which may be derived from shot peening.

It is generally conceded that a highly polished fatigue specimen represents the optimum condition for maximum fatigue life at a given hardness level. The hardness level, of course, is important in determining the ultimate strength of the material. Such a highly polished surface is obtained by processing a previously ground surface with .00 emery cloth so that polishing marks are parallel to the axis of stress.

How peening helps

Obviously, it is extremely difficult, if not impossible, to apply this type of finish to production parts. But even when such polishing is feasible, two other factors must still be considered.

For one, it must be possible to accurately determine the axis of stress *in operation*. On an intricate, moving part, this presents a highly complicated problem.

Also, the optimum surface finish must be main-

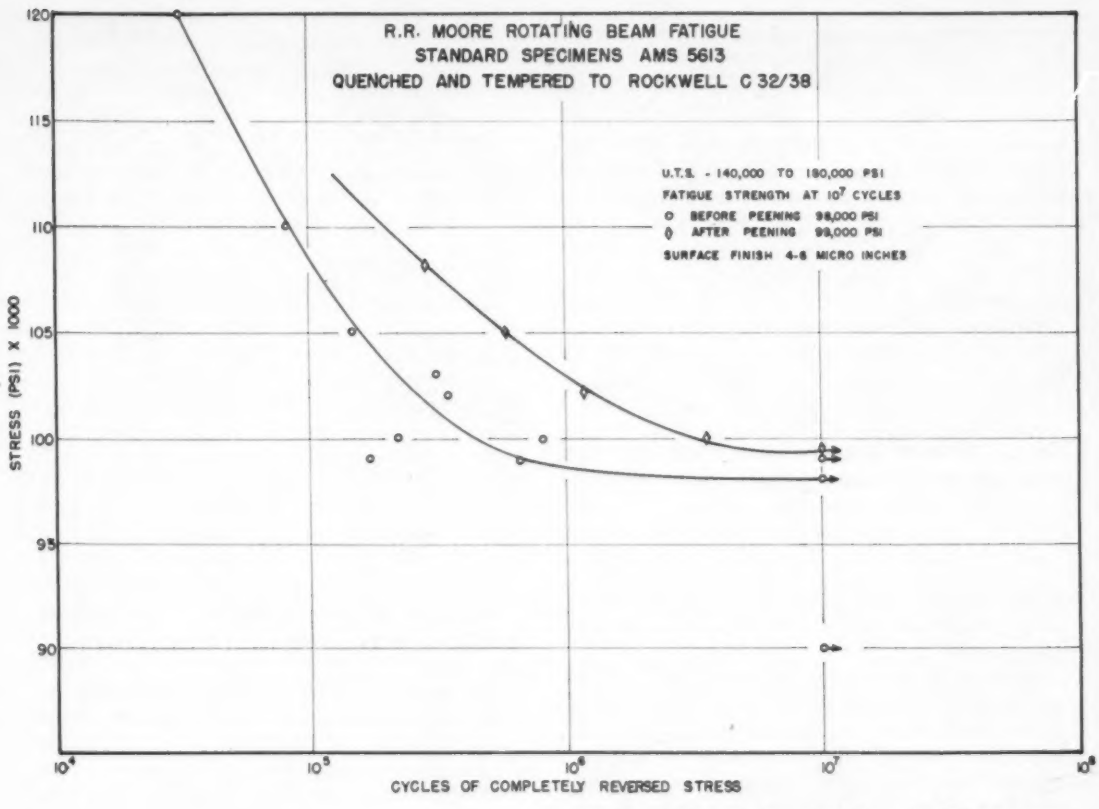


FIG 1—Shot peening provides only slight improvement over a 4-6 microinch finish.

tained on the part throughout its service. The part must remain free of surface imperfections at all times. Even a small pit or nick will drastically lower fatigue life by concentrating stresses and, in effect, producing a severe, localized stress.

Since it is almost impossible to satisfy all of these rigorous surface requirements—especially on a production basis—shot peening often presents a logical, and relatively simple, alternative. Once the use of shot peening has been decided upon, it is first necessary to choose a shot size and type best suited to the particular application.

As for shot size, experience indicates that the shot diameter should approximate one-half the radius of the fillet or groove to be peened. Shot type is also important. Industry is becoming increasingly aware of the advantages of steel shot that has been heat treated to a hardness of Rc 45-50.

A distinct advantage of heat treated steel shot is its relative ductility. Chilled cast iron is extremely brittle and, as a result, in-service breakage is high. Broken shot not only complicates maintenance problems. It can also cause severe damage to production parts.

The effects of shot peening as a function of surface finish are highly significant. A fatigue specimen peened with small (S-70) steel shot shows a slight improvement over a surface polished to a 4-6 microinch finish. The extent of this improvement is shown in Fig. 1.

While the increase in fatigue life is relatively slight in a straight section, it is more pronounced in parts having fillets and radii. Results obtained with typical notched specimens are shown in Fig. 2.

Peening provides control

Normally, the surface finish of a finish ground specimen is approximately 32-45 microinches. Shot peening actually tends to roughen this finish. The roughening effect is not detrimental because the strengthening effect of shot peening is sufficient to offset it. Other representative changes in surface finish resulting from shot peening are shown in Table I Note particularly the effects of hardness, shot size, and peening intensity.

These results indicate an overall pattern in respect to surface finish after peening. In general, it is evident that shot peening produces a rougher finish than that normally obtained in

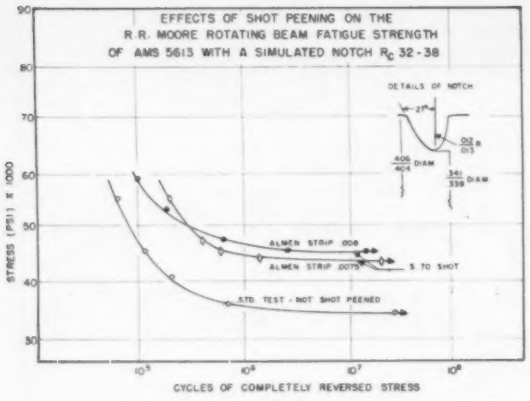

EFFECTS OF SHOT PEENING ON THE
R.R. MOORE ROTATING BEAM FATIGUE STRENGTH
OF AMS 5613 WITH A SIMULATED NOTCH R_c 32-38
DETAILS OF NOTCH
ALMEN STRIP .008
ALMEN STRIP .007
5 TO SHOT
STD. TEST - NOT SHOT PEENED
STRESS (PSI) X 1000
CYCLES OF COMPLETELY REVERSED STRESS

FIG. 2—Value of shot peening is underscored by notch on these 12 pct chromium steel specimens.

TABLE I

Material — AMS 6412

Hardness	Surface Finish Before Peening	Shot Size	Intensity	Surface Finish After Peening
RC 23	32-45 micro inches	S-70	9A2	120-150 micro inches
RC 28	" " "	"	"	120-150 " "
RC 36	" " "	"	"	130-150 " "
RC 39	" " "	"	"	140-160 " "
RC 44	" " "	"	"	160-180 " "
RC 23	" " "	S-110	10A2	90-100 " "
RC 28	" " "	"	"	130-150 " "
RC 36	" " "	"	"	130-150 " "
RC 39	" " "	"	"	110-130 " "
RC 44	" " "	"	"	110-130 " "
RC 23	" " "	S-330	28A2	160-220 " "
RC 28	" " "	"	"	160-220 " "
RC 36	" " "	"	"	180-230 " "
RC 39	" " "	"	"	160-200 " "
RC 44	" " "	"	"	160-200 " "

finish grinding. Significantly, the peened finish is controllable and falls in the range of 100-200 microinches.

Much of the information contained in Table I can be put to good use in the shop. It indicates that a profilometer reading, rather than visual inspection, can be safely applied to determine whether or not a part has been shot peened after grinding. This could prove to be a valuable inspection tool.

Another significant finding not referred to in the charts or tabular matter may also prove of practical value in production. It is that surface finishes rougher than those listed in Table I can be improved to within the 100-200 microinch range by shot peening.

When the geometry of a part involves an abrupt change in section such as might form a radius or fillet, fatigue life is affected adversely. This phenomenon is commonly referred to as "notch effect." From the standpoint of design, it can be of critical importance.

Notch affects strength

Some idea of the role played by notch effect can be gained from a typical example. The average fatigue strength of AMS 6470 (modified Nitralloy) steel heat treated to BHN 241 with a finish ground surface is about 68,500 psi. A 0.025 in. radius notch lowers fatigue strength to about 42,000 psi. An even smaller notch (0.004-0.006 in. radius) further reduces the strength to 21,500 psi.

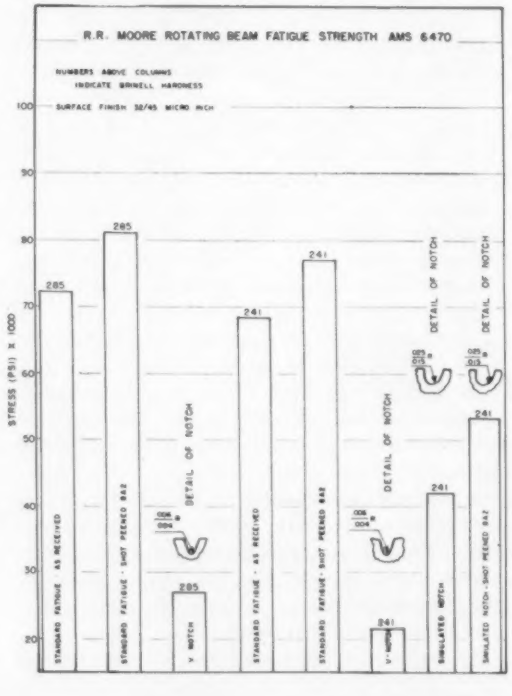
Shot peening is capable of improving the fatigue strength of a 0.025 in. notched specimen. A very much smaller radius can not be effectively peened because available shot size is too large to impinge upon the root radius of the notch.

These test results tend to confirm that shot peening can improve the fatigue properties of both unpolished and/or notched specimens. Degree of improvement depends directly upon surface finish and notch radius. The sharper radius (if it can be peened effectively) and the rougher surface tend to show greatest percentage improvement.

One point deserves particular emphasis. As effective as peening may be, it can not restore the fatigue life of a notched surface to that of a comparable surface without a notch.

Together with intensity, shot size is a controlling factor in the effectiveness of shot peen-

FIG. 3—Notch configuration has a marked effect on fatigue characteristics of a nitriding steel.



ing. As a general rule, a smaller size shot will provide greater coverage than a larger size shot in the same time interval. Smaller shot also provides a greater depth of maximum compressive stress at a given air pressure. This improved penetration is probably due to the higher velocities attained by the smaller shot. Another advantage of smaller shot is its ability to impinge directly upon smaller radii and fillets.

Shot size counts

Large shot has less of a tendency to break down. It is also able to provide a higher intensity at a lower air pressure. This advantage may be of only relative importance since an increase in intensity does not necessarily signify an improvement in fatigue properties.

Fig. 4 shows the effect of three different shot sizes on five hardness ranges of AMS 6412 steel. Use of an S-330 shot actually results in a lowering of fatigue values. This condition applies to specimens having a finish ground surface but no radii or fillets.

Dimensional change as a result of shot peening is of only minor importance in a majority of applications. It may be of some significance when peening is applied to holes, threads, or serrations. In such cases, peening will tend to decrease size. When applied to the diameter of a round, peening tends to have the opposite effect. A small shot (such as S-70) may have an abrasive effect when applied at higher intensities.

Contrary to popular belief, shot peening has a beneficial effect on fatigue life at elevated temperatures. Shot peening notched specimens of Nimonic 80 at 8A2 intensity resulted in a 30 pct improvement in fatigue life even after tempering for 50 hours at 1000°F. A high strength, low alloy steel shows a loss of only 1000 psi after shot peening and tempering for 100 hours at 700°F. Results of these tests are shown in Fig. 5.

The tendency in commercial practice has been to peen with more air pressure than is necessary or, in some instances, desirable. Tests indicate that 50 psi is an adequate air pressure for all but the smallest shot.

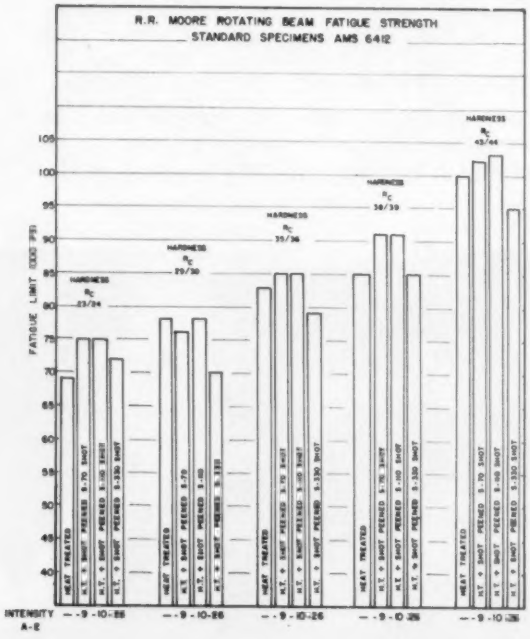
Exceeding the 50 psi limit may result in raising the arc height of the Almen test strip. But, as the results shown in Fig. 4 seem to prove, excessive air pressure does not improve fatigue life. It can be concluded that there is no direct relationship between arc height and fatigue life.

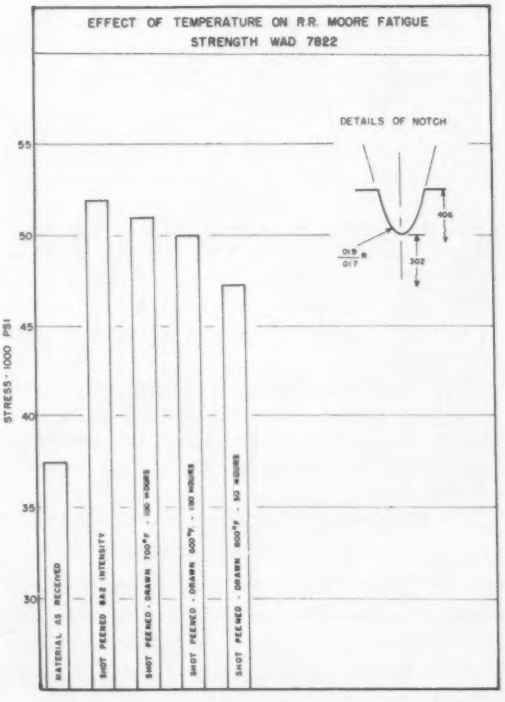
Electroplating in standard plating solutions usually has an adverse effect on fatigue properties. For example, a low alloy steel (AMS 6412) heat treated to Rc 40 and polished to a 6 microinch finish initially showed a fatigue strength of about 90,000 psi. When duplicate specimens were hard chrome plated, fatigue strength dropped to 46,000 psi.

A part of this exorbitant loss of strength can be saved by shot peening *before* plating. Shot peening of plated surfaces should be avoided.

FIG. 4—(Below) **This chart indicates that it is possible to overpeen to the detriment of fatigue.**

FIG. 5—(Right) **Tempering between 600-800°F had only a minor effect on the benefits of shot peening.**




EFFECT OF TEMPERATURE ON R.R. MOORE FATIGUE STRENGTH WAD 7822
DETAILS OF NOTCH
STRESS - 1000 PSI
MATERIAL AS RECEIVED
SHOT PEENED 8A2 INTENSITY
SHOT PEENED - DRAWN 700°F - 100 HOURS
SHOT PEENED - DRAWN 800°F - 100 HOURS
SHOT PEENED - DRAWN 800°F - 50 HOURS

Takes less than 4 sec—

Pushbutton Setup Welds Aluminum Tubing Joints

◆ In making aluminum evaporator assemblies for refrigerators, Hotpoint Co. brazes aluminum coils to aluminum sheet . . . After forming, it is necessary to connect the pipes extending from the coil to the remainder of the system.

◆ This is done, in part, by Heliarc welding of aluminum-to-aluminum joints, by silver brazing copper joints . . . Circular welds are produced in two ways . . . Under 250 psi pressure tests, weld leaks in completed units are rarely found.

By **ROBERT LOOSE**, General Foreman,
Evaporator Dept., Refrigerator Plant,
Hotpoint Co., Chicago

◆ CIRCULAR aluminum-to-aluminum joints between tubing sections are being made at Hotpoint Co.'s Chicago plant by inert gas welding. The method employs Heliarc equipment, using argon as the shielding agent.

The operation is a part of the production sequence in turning out evaporator units for domestic refrigerators. It begins with evaporator units made of aluminum sheet, to which aluminum tubing in serpentine coils has been brazed (see THE IRON AGE, Jan. 19, p. 78—Good Handling Steps Up Brazing Furnace Output). Ends of these coils must be connected to external copper tubing that includes a condensor coil.

This is accomplished with short lengths of purchased tubing, one portion of which is aluminum, the other copper. These lengths have been joined by a special welding process in another plant.

Two problems remain—to produce permanent and completely leakproof joints between the copper ends of the composite lengths and the copper external circuit, and to join the two aluminum ends of the two composite lengths to the evaporator coil aluminum tubing. The first is readily accomplished by silver brazing. The second is handled in the following fashion.

There are two ways such circular joints in tubing can be made—either the tubes can be rotated while the torch remains fixed, or the

FIG. 1: (Right) Aluminum ends of refrigerator evaporator assemblies are end-joined to aluminum ends of short part-copper, part-aluminum tubes with this Heliarc welding setup. Rate: 100 welds an hour.

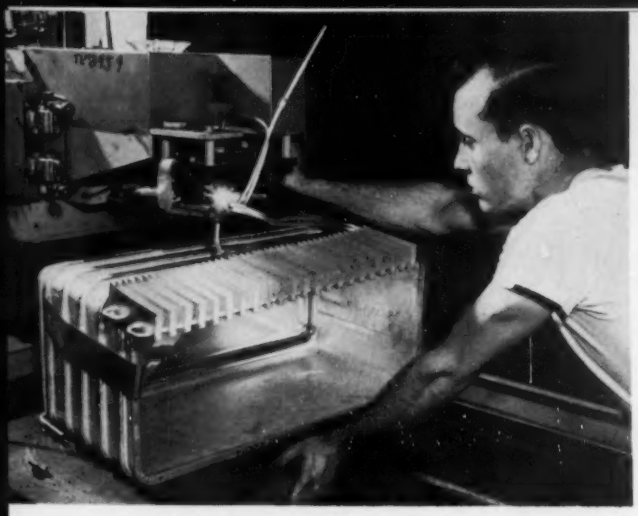


FIG. 2: Somewhat faster and more convenient than machine in Fig. 1, this special Linde welder-setup includes a Heliarc torch that rotates slowly while the welding operation goes on.

torch can be rotated around the fixed tubes. The first method has been used successfully with several welding machines built by Hotpoint, but equipped with Linde Air Products Co. torches and controls. These machines are still used, but are now supplemented and may be displaced by newer Linde machines using rotating torches.

Torches in both type machines employ tungsten electrodes. These are not consumed, since the torches are water-cooled and supplied with Linde argon gas fed through Oxweld reducing valves and flowmeters adjusted to the particular welding conditions.

One of the older machines, used for some years, is shown in Fig. 1. In this operation, an evaporator is mounted in a holder above the welding booth, with one end of the aluminum tube extending down from it and clamped at a point above the torch. Another, lower clamp holds one of the short composite copper-aluminum tubes, aluminum end up, in line with the first tube, so that they butt end-to-end at a point directly opposite the torch electrode.

When the operator pushes his button, the two tubes start to rotate slowly, together with the evaporator unit itself. At the same time, the shielding gas starts to feed and the arc is struck by high frequency ac current. When welding is completed, the current and gas shut off, rotation ceases, and the assembly, now including the length of composite tubing, is unclamped and removed.

About 100 welds an hour can be made in such machines. Actual welding takes about 4 seconds, the remaining time going for loading and unloading. Grounding is done by brushes bearing on the edges of discs that rotate with the work at points below and above the weld. In this setup, the torch remains fixed, and flexible tubes are connected in standard fashion to carry water to and from the torch and to feed the shielding argon. Gas flow runs about 15 cu ft an hour, but of course continues only during the welding portion of the operation, which is a small part of the total cycle.

Similar work is done in welding the second end of the evaporation coil to an aluminum header, a length of 1¼ in. aluminum tube with a wall 0.060 in. thick. Both ends of this tube are tapered by swaging, to make them fit mating components to which they are Heliarc welded. One of these components is a short length of the copper and aluminum tubing, the joint being made with the aluminum end.

Welding is done in setups somewhat similar to that in Fig. 1. As the header is much smaller than the evaporator assembly, the welder can be loaded more quickly, and about 150 welds per hour are produced. This assembly is subsequently welded to the second end of the evaporator tube, in a setup again as in Fig. 1.

Before taper-swaging the second end of the header, a bag made of fine stainles steel mesh, and containing silica gel, is placed in the header. The gel absorbs any moisture that may be trapped in the circuit.

Fig 2 shows one of the new Linde welders joining one end of a short tube to one end of an aluminum condensor coil, the assembled condensor merely being placed on a metal table in such position that the coil end to be welded projects upward to a point opposite the end of the torch, against the mating component.

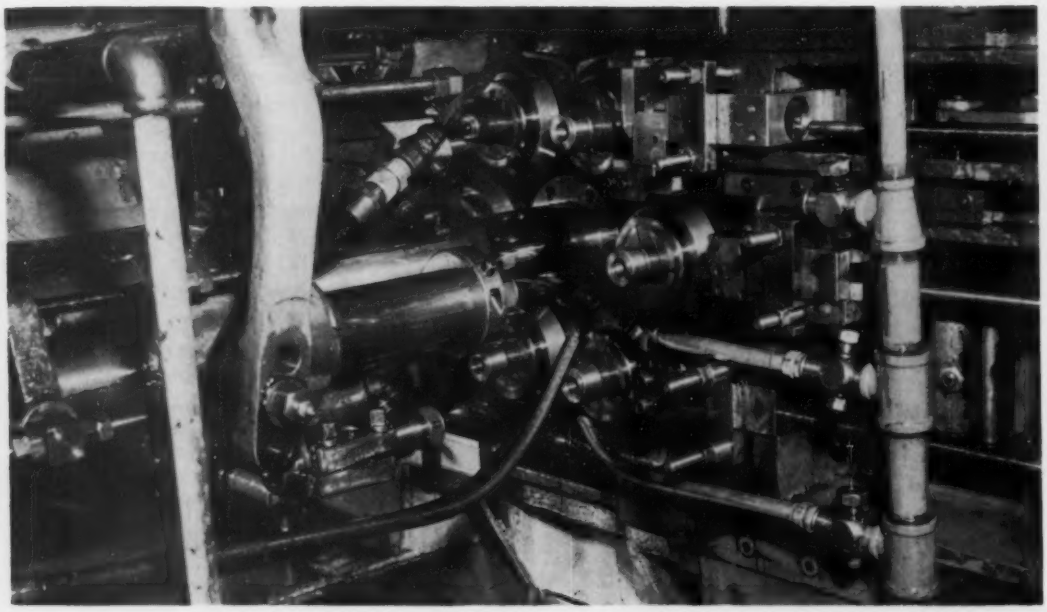
In this setup, the torch rotates around the work which remains in fixed position, the torch being attached to a slowly rotating component of the welder. Since cooling water and argon gas must be supplied to the torch, however, three flexible tubes are attached to the torch and arranged in such manner that they will coil into the groove of a horizontal pulley which rotates along with the torch. This eliminates the need for rotating joints. A counterweight arrangement returns the pulley and torch when, after a full revolution, the weld is completed.

Loading time is somewhat decreased in the new machine. Partly for this reason, cycle time is shorter and hourly output increased.

Good penetration is obtained with Heliarc welding and so are uniform welds of high grade, since the automatic welder assures close control of welding conditions. All welds subsequently undergo tests at 250 psi pressure, with other portions of the completed assembly, while submerged in a glass-walled water tank. Weld leaks would thus be quickly spotted if present, but are in fact rarely found.

Holds close tolerances—

Carbide Reamer Outproduces Six Grinders



CARBIDE REAMER holds tolerances of ±0.00025 in. in high speed production of pinion gears.

◆ COSTLY finish-grinding of pinion gear holes has been eliminated by use of a carbide reamer. Six grinders formerly were needed to hold critical tolerances and to keep pace with high speed production requirements at the transmission plant of Chrysler Corp., Indianapolis. The carbide tool easily and consistently maintains necessary ±0.00025-in. tolerances and produces an excellent surface finish requiring no additional operations.

Fully 800 to 1000 holes are reamed before tool regrind is necessary.

Pinion gear blanks are cut from AISI 4028 steel bar stock 1-17/32-in. diam. Processed on a 6-spindle automatic screw machine, parts are: 1) faced on both ends, 2) turned, grooved and chamfered on the OD, and 3) drilled, reamed and countersunk on the ID.

Only a light finish is required of the reamer. Elimination of grinding operations by the carbide tool has permitted large savings, and has done so without reducing screw machine output. Reamers are expensive, but have long tool life.

Besides savings in valuable space, grinding charges are eliminated, including those for labor and materials. Planetary pinions are among numerous parts for Powerflite automatic transmissions used in the entire line of Chrysler automobiles. Both parts and assembled transmissions are turned out in the Indianapolis plant.

SIDELINES

are essential to

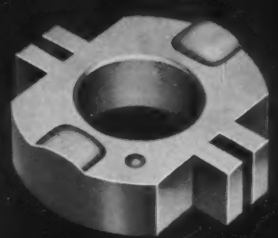
Football

Baseball

Tennis

but <u>not</u> to manufacturing.

Bound Brook produces no "sideline" products-<u>only</u> the world's finest Powder Metallurgy Bearings and Parts.....



BOUND BROOK OIL-LESS BEARING CO., BOUND BROOK, N. J. EST. 1883

You Get Better Results in HEAT TREATING!

Use the NIAGARA AERO HEAT EXCHANGER to control the temperature of your quench bath and you remove the heat at its rate of input, always quenching at the exact temperature that will give your product the best physical properties.

The Niagara Aero Heat Exchanger transfers the heat to atmospheric air by evaporative cooling. It extends your quenching capacity without using extra water. It pays for itself with water savings.

You can cool and hold accurately the temperature of all fluids, gases, air, water, oils, solutions, chemicals for processes and coolants for mechanical and electrical equipment. With the Niagara Aero Heat Exchanger you have closed system cooling, free from dirt and scale.

Write for Bulletin No. 120

NIAGARA BLOWER COMPANY
Dept. IA, 405 Lexington Ave.
NEW YORK 17, N. Y.

District Engineers in Principal Cities of U. S. and Canada

FREE AIDS

New Technical Literature:

Catalogs and Bulletins

Surface finish checker

Bulletin LT17 describes the Profilometer Group II—a versatile, portable equipment combination for measuring surface roughness in the shop. This equipment is described as measuring more than 85% of all the varied surfaces produced by industry and measuring all surfaces in many plants. It includes an Amplimeter, a Type LJ Tracer, and a Mototrace for mechanical operation of the Tracer. *Micrometrical Mfg. Co.*

For free copy circle No. 1 on postcard, p. 89

Heavy press extruding

A 24-page booklet covering one firm's heavy press extrusions is now available. The publication gives detailed information on two new 8000 ton presses at the company's heavy press plant; how they operate; their manufacturing capacities; as well as extrusion design suggestions. The brochure is designed to aid purchasing, production and engineering personnel in understanding of heavy press extrusions and the benefits possible through their use in a broad range of industries. *Industrial Service Div., Kaiser Aluminum.*

For free copy circle No. 2 on postcard, p. 89

Fork truck

Two new electric fork trucks designed especially for maneuverability, ease of maintenance, and operator comfort and convenience, are described in new bulletins. One bulletin covers a 4000 lb truck, and another bulletin contains details on a 6000 lb truck. The 6-page bulletins give performance specifications, dimensions, details on controls and construction, explain features, and picture components and available attachments. *Baker-Raulang Co.*

For free copy circle No. 3 on postcard, p. 89

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 89.

Steel strapping

A new, 2-page catalog sheet gives the widths and thicknesses, number of ft per lb, and tensile strengths of both light- and heavy-duty strapping in all available sizes. *Allegheny Steel Band Co.*

For free copy circle No. 4 on postcard, p. 89

Tap guide chart

A tap guide wall chart contains 12 quick-reference tables arranged in an adaptation of calendar style for wall mounting. Tables include: tap pitch tolerances compared with NSTC and Unified Thread Class Fits 0-80 through 1½-12; tap drill sizes from 0-80 through 1-27 with basic thread dimensions; suggested tapping speeds; suggested tapping lubricants for wide range of irons, steels and alloys being tapped; rake angles for tapping various materials; decimal equivalents; and tap terminology. *Wood & Spencer Co.*

For free copy circle No. 5 on postcard, p. 89

Batteries

A line of flat-plate batteries are illustrated and described in a new folder just issued. Known as the Exide Powerclad, the batteries are reported to feature high power, electrical efficiency and dependability coupled with low operating costs. Cutaway drawing shows details of construction. *Exide Ind. Div., Electric Storage Battery Co.*

For free copy circle No. 6 on postcard, p. 89

FREE TECHNICAL LITERATURE

Contour saw machining

A 10-page folder describes the use of the contour band saw in machining of metals and other materials. This use is reportedly based on the ability of the band machine to cut directly to a layout line, to remove unwanted metal in whole sections, to navigate virtually any contour and to cut continuously. A concise but highly informative summary of the cutting geometry of the basic machine tools is followed by a graphic outline of the band machine's capabilities. *The DoAll Co.*

For free copy circle No. 7 on postcard, p. 89

Speed reducers

A new catalog describes the principles of operation of an infinitely variable speed transmission with output speeds from true zero to ¼ input speed. Standard models are shown with optional variations, typical applications and installation suggestions, dimensions and ratings and description of technical services available. *Revco, Inc.*

For free copy circle No. 8 on postcard, p. 89

Drying spray for cores

An 8-page bulletin describes foundry experience with an air drying spray for green sand cores and molds. Reportedly written from actual users' experience, it points up core and mold applications that are described as saving time and producing smoother castings of uniformly high quality. *United Oil Mfg. Co.*

For free copy circle No. 9 on postcard, p. 89

Drafting supplies

A new booklet called "11 Ways to Save Drafting Time," is now available to engineers and draftsmen. It's described as the first booklet that compiles the many ways of using intermediates to make quick modifications of drawings without changing the original. The booklet discusses 11 specific ways to use intermediates, with each of the techniques clearly illustrated. Among topics covered are scissor editing, masking, the block-out method, successive additions and pre-printing. Other methods shown are transparent matte tape, pick-off transfer. *Frederick Post Co.*

For free copy circle No. 10 on postcard, p. 89

AIR LIFT
for heavy materials
Crowded isles and sluggish flow of materials cost you money. So why not go over the top! You can speed production, cut your costs with Conco Cranes, custom designed for your specific needs. Let us show you how. Write for a trained Conco engineer to call and make recommendations, or request bulletin 3000A covering our complete Conco line. Conco Cranes are backed by 37 years of experience.
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...FOR SAFETY SPECTACLES

that combine the protection your workers need with the style and comfort they want.

New Style WFH

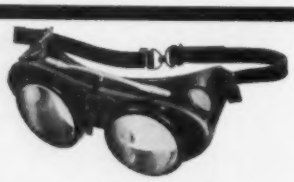
Handsome safety spectacle with new lens shape in frames with demi-amber overlay on upper half of crystal butyrate.

Exclusive Contour-Spec®

Patented hinged bridge makes this spectacle the most comfortable to wear. Provides full closure around eye cavity.

...FOR CUP GOGGLES

that provide the utmost in eye protection. The complete range of Willson goggle styles meets every eye protection need.



Convenient Kover-Mor®

This roomy style CC70 goggle is roomy enough to go over almost any style of personal glasses. Rigid top bar makes them easy to put on and take off with one hand.

...FOR RESPIRATORS AND GAS MASKS

for almost any respiratory hazard. The Willson line carries more Bureau of Mines approvals than any other.

Interchangeable Series 800

This is the first truly interchangeable respirator. It requires no additional parts or accessories to make use of 4 different cartridges and 4 different filters or combinations of both.

...FOR HARD HATS AND CAPS

In either lightweight Fiberglas, in 5 colors, or fabric reinforced Phenolic Resin, the strongest hat shell made. Choice of four suspensions to suit your individual requirements.

Super-Tough Phenolic

This toughest of all safety hats is reinforced with ten individual die-cut pieces of sturdy duck and molded under pressure to withstand repeated drop-ball tests *without fracture!*

WILLSON PRODUCTS, INC.

Over 300 Safety products carry this famous trademark

231 Washington Street • Reading, Pennsylvania

FREE TECHNICAL LITERATURE

Excavator-crane

A new bulletin (15-B-4) describing an excavator-crane is now available. Illustrated with on-the-job photographs and closeups of mechanical features, the 40-page booklet includes complete specifications and working ranges. The unit is a ½ yd. shovel described as readily convertible to dragline, clamshell, dragshovel or lifting crane for handling a wide range of excavating and lifting jobs. It is offered with gasoline engine, diesel engine, or electric motor. *Bucyrus-Erie Co.*

For free copy circle No. 11 on postcard, p. 89

Product summary

A new, 24-page directory of product literature—"This is A-C From A to Z" — has been released by Allis-Chalmers. In addition to an alphabetical description of company products and their descriptive literature, the directory has a brief history of the company as an introduction. It also lists the location of the firm's 17 plants, offices and tractor branch houses. *Allis-Chalmers Mfg. Co.*

For free copy circle No. 12 on postcard, p. 89

Laminate for lining

A bulletin describes a new lining material that can be applied to inexpensive containers, tanks and pipes. The lining material is a laminate of plastic fused and flowed into a glass fiber cloth backing. Conventional adhesives, the bulletin states, can be used to apply the laminate to practically any contoured surface, and it is described as capable of being applied to large tanks and vessels right on-the-job without moving them to an applicator's shop. *Garlock Packing Co.*

For free copy circle No. 13 on postcard, p. 89

CO_2 for welding

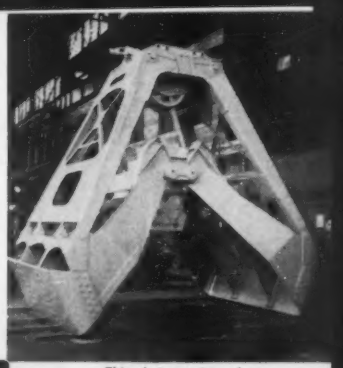
A new catalog describing CO_2 supply systems for use in the welding industry is now available. Complete information is included covering gas flow obtained from one manufacturer's products in this field. Typical welding applications are illustrated. *Pure Carbonic Co.*

For free copy circle No. 14 on postcard, p. 89

In ore clean-up buckets

FABRICATION SIMPLIFIED WITH USS "T-1" STEEL

(and weight reduced more than ½ ton)



This photo courtesy of Blaw-Knox Company.

HALF AS THICK! In the trays for giant ore clean-up buckets, 1¼" USS "T-1" Steel Plate, with a yield strength of 90,000 psi., replaces cast trays which were as much as 2½" thick. The new buckets —lighter in weight by more than half a ton — and expected to outperform the heavy cast trays, will be used at United States Steel's South Works.

UNITED STATES STEEL CORPORATION, PITTSBURGH
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL SUPPLY DIVISION,
WAREHOUSE DISTRIBUTORS, COAST-TO-COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

• The trays of ore clean-up buckets must have phenomenal shock and abrasion resistance to hold up under constant scraping and scouring along the steel bottoms of ore boats. They are commonly made of heavy steel castings. But recently, Blaw-Knox Company, Pittsburgh, Pa., *fabricated* trays for several new buckets from USS "T-1" Steel Plate. This amazing new alloy steel assures the needed strength and durability, plus important fabricating advantages.

LESS WEIGHT — LESS EXPENSE

Biggest single advantage of fabricating from "T-1" Steel Plate is less weight. New trays weigh only 4,021 pounds each, compared to 5,068 pounds for comparable cast manganese steel trays. Thus, "T-1" decreases the weight of the bucket and reduces shipping and handling costs.

What's more, fabrication from "T-1" simplified the building of these huge buckets. It eliminated the expensive patterns needed for cast trays. Because "T-1" has tremendous resistance to impact abuse and abrasion, it is expected that it will outperform previously used materials.

For these ore buckets, "T-1" Steel is flame-cut to size, *cold formed* in a 1,250-ton press, drilled and then riveted to the bucket shell. "T-1" also can be welded—without pre- or post-heating. Because of its unusual combination of properties, it is cutting costs in many rugged applications.

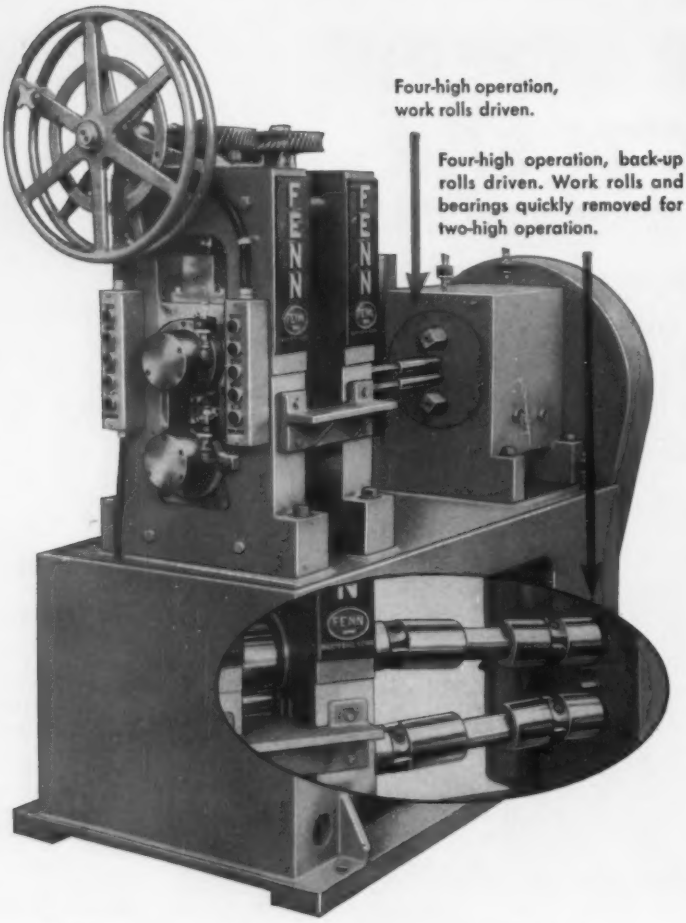
LOOK AROUND YOUR SHOP

In your own equipment, or in the products you make for others—wherever you would like to increase service life . . . wherever you would like to reduce fabricating costs of heavy-duty parts—look into the possibility of using "T-1" Steel. Competent technical advice is always available, of course — free of charge — from United States Steel. Write, wire, or phone for complete information. United States Steel, Room 5213, Pittsburgh 30, Pa.

USS "T1" CONSTRUCTIONAL ALLOY STEEL

USS

UNITED STATES STEEL


Four-high operation, work rolls driven.
Four-high operation, back-up rolls driven. Work rolls and bearings quickly removed for two-high operation.

Unique three-way drive gives unlimited flexibility

Fenn's new combination laboratory rolling mill may be operated as . . .

- Two-high
- Four-high, work rolls driven
- Four-high, back-up rolls driven

Efficient operation is assured over a complete range of reductions, extra-high bearing capacities permit substantial reduction of the newest, toughest materials.

Fenn engineering is at your service to roll samples of your material, to furnish practical and theoretical assistance as needed.

FENN

Precision Rolling Mills — Turks Heads — Wire Shaping Mills
Swaging Machines — Wire and Tube Drawing Machines

The Fenn Manufacturing Company, 318 Fenn Road, Newington, Connecticut

Plant profile

Engineering and manufacturing facilities available in the company's California plant are described in a 31-page booklet released by Westinghouse. The booklet outlines the development, production and testing capabilities of the plant. Description of projects carried on indicates they cover not only electrical apparatus, but also hydraulic, aerodynamic and mechanical equipment. Included also is a complete list of the machinery in the plant. *Westinghouse Electric Corp.*

For free copy circle No. 15 on postcard, p. 89

Welding tube steels

Technical Data Card 155A summarizes the various recommendations for joining various tubing steels, by arc welding procedures. In addition to indicating the proper electrodes to use, it provides information about preheating and postwelding heat treatments. Fabricators and others who have occasion to weld stainless steels and chromium molybdenum alloy steels in tubing and other forms will reportedly find this card valuable as a reference. *Tubular Products Div., Babcock & Wilcox Co.*

For free copy circle No. 16 on postcard, p. 89

Vibration control

A complete line of vibration control material is described and illustrated in a catalog just released by a firm specializing in shock and vibration control. The material, called Isolant, is recommended for massive, difficult to isolate machinery because it reportedly provides effective isolation of the combination of vibration, shock and noise, due to its high structural strength and resiliency.

The catalog describes the granular structure of the product, which is made up of millions of hermetically-sealed minute air cells that expand or contract in accordance with the applied load, thereby "floating" the machinery on a cushion of air. Detailed descriptions of the typical installations are given, as are proper methods of installation. *T. R. Finn & Company, Inc.*

For free copy circle No. 17 on postcard, p. 89

FREE TECHNICAL LITERATURE

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

This section starts on p. 84

Hot spray painter

Literature is available illustrating a quick change color selector system which combines a new design selector valve with the firm's heater unit. The system is reported to offer the advantages of hot spray for the installation which requires frequent color changes, as well as for the continuous duty single color operation. *Spee-Flo Co.*

For free copy circle No. 18 on postcard

Visual alarm systems

Systems of visual alarm devices for complete industrial plant protection are detailed in a new catalog. One type of alarm sequence is illustrated, while a line of annunciators are pictured and described in detail. Wiring diagrams for systems incorporating the annunciators are also included. *Autocall Co.*

For free copy circle No. 19 on postcard

Lockpins

The Model B Series of a company's self-locking, quick-release pins are described in a 4-page bulletin. Design and construction features, head styles, dimensional and strength data are included. *Aviation Developments, Inc.*

For free copy circle No. 20 on postcard

Spectrographic supplies

A new spectrographic supplies catalog is now available. The catalog contains 13 pages of listings of special pure materials and alloy standards. Other listings cover carbon and graphite rods and powders; preformed electrodes; photographic plates, film and processing chemicals; lists of texts and reference books. *Jarrell-Ash Co.*

For free copy circle No. 21 on postcard

Speed reducers

A new 52-page bulletin, "Speed Reducers" (No. 450), is available. This illustrated booklet which contains full information about a line of speed reducers, which has been recently re-engineered, re-rated and expanded. Included are horsepower rating tables, specifications, dimensions, weights, and other data needed for selection of speed reducers for various applications. *Farrel-Birmingham Co., Inc.*

For free copy circle No. 22 on postcard

Bender

A circular describes a bench model automatic tube bender reportedly capable of making up to 1500 bends an hour. Design and construction features of this unit are detailed. The machine is recommended for bending tubing of steel, aluminum, brass, copper or stainless steel up to 5/8 in. OD x 3 in. centerline radius. *Paul Machine Tool & Die Works.*

For free copy circle No. 23 on postcard

Cut-off blades

A catalog describes a new line of super high speed steel cut-off blades with a hardness said to permit unusually high speeds and feeds on automatic screw machines. The booklet gives details as to features, sizes and prices. *Somma Tool Co., Inc.*

For free copy circle No. 24 on postcard

Pressure controller

Bulletin 7040 describes a new small-case indicating pressure controller. The unit is listed as available in ranges from 0-50 to 0-200 psi, with on-off or 10 pct throttler control. *Minneapolis - Honeywell Regulator Co.*

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Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **3/1/56**

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FIRST CLASS PERMIT No. 36 (Sec. 34.9 P.L.&R.) New York, N. Y.

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THE IRON AGE

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Village Station

NEW YORK 14, N. Y.

Magnetic chucks

A new brochure on superpower magnetic chucks and accessories covers one firm's standard lines of rectangular magnetic chucks, rotary magnetic chucks, sine angle magnetic chucks, and magnetic work drivers. Included under accessories are control switch equipment, demagnetizers and magnetic parallels and V-blocks. *Taft-Peirce Mfg. Co.*

For free copy circle No. 26 on postcard

Milling machine

A new, 16-page, two-color catalog describes a company's line of "threads with one turn" semiautomatic thread milling machines. The booklet provides detailed information, including description of exclusive cam action, machine specifications, case histories, special adaptations and tables of feeds and speeds. *Hanson-Whitney Co.*

For free copy circle No. 27 on postcard

Abrasive belt grinding

"How Abrasive-Belt Grinding Increases Production" is a new, 31-page booklet consisting of 46 illustrated case histories. Application studies are grouped according to each of five types of abrasive belt machining—platen, contact wheel, formed wheel, centerless, and flexible belt, and cover a wide range of materials—ferrous and non-ferrous metals, glass, wood, and plastics. Specific advantages of belt surfacing are discussed in each cost reduction study. *Engelberg Huller Co., Inc.*

For free copy circle No. 28 on postcard

Machining jet blades

Precision machining of jet engine compressor and turbine blades is the subject of a new bulletin. Profile milling, grinding and polishing are described in the text and supplementary pictures show typical applications of these operations. The sequence of steps performed within each of the major divisions cited above are detailed in the bulletin. The bulletin also lists complete specifications for each of the five machines mentioned: two milling machine models, two grinders and a polisher. *Ex-Cell-O Corp.*

For free copy circle No. 29 on postcard

Controls

A 4-page condensed catalog of special interest to design engineers is concerned with timers and electromechanical switches. The bulletin shows pictures, diagrams and general specifications covering this manufacturer's line of standard and special foot, lever, limit and push button switches as well as its electronic and synchronous-motor timers and custom control panels. *General Control Co.*

For free copy circle No. 30 on postcard

Clutch

Bulletin ML-102-A describes a ventilated clutch designed and built for heavy duty service. It contains a description of all sizes of clutch elements and applications, including complete dimension and capacity data. Ventilated construction, a distinctive feature of this clutch, is discussed. Listings are made showing uses of the clutch in drilling, metalworking, construction and other industries. *Fawick Airflex Div., Fawick Corp.*

For free copy circle No. 31 on postcard

Rectifiers

A new, 2-color, 12-page technical bulletin describes and illustrates a firm's selenium rectifiers for electroplating, anodizing and related processing. The bulletin lists construction, electrical and control features of this rectifier group and includes specifications of standard bench, self-contained, and remote controlled types of units. The book covers the complete line of ratings from 6 to 48 v. output. *Hanson-Van Winkle-Munning Co.*

For free copy circle No. 32 on postcard

Enclosed presses

A new line of multiple point enclosed presses are completely described in a 32-page, 4-color catalog. Six basic types of presses, from 200 to 2500 ton are featured in the catalog; two and four point single action presses, two and four point double action presses, a four point single action underdrive press, and a four-point triple action underdrive press. The catalog also describes specialized features of the press as well as listing complete specifications and dimensions. *E. W. Bliss Co.*

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Crucible stainless steel, type 304, is used throughout this Sparkler standard horizontal plate filter.

Constant filtration of chemicals, pharmaceuticals, foods and liquids subject this horizontal plate filter to pretty rugged corrosive, abrasive and temperature conditions. That's why Sparkler Manufacturing Co. uses all-stainless steel construction.

For stainless, first of all, fights off corrosive attack. And it's strong. Stainless becomes tougher the more it's used . . . which is another way of saying that, with stainless, abrasion is no problem. And neither is cleaning. For stainless steels' smooth, bright surface comes clean with a minimum of effort . . . stays clean longer.

The fact is, stainless makes any equipment stronger, longer-lasting, easier to use. Check with your local Crucible representative for help in selecting the best stainless grade for your job. Or write *Crucible Steel Company of America, The Oliver Bldg., Mellon Sq., Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

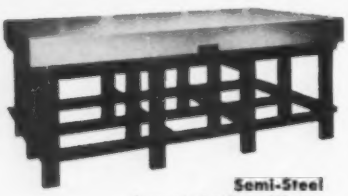
Crucible Steel Company of America

NOW TWO TYPES OF CHALLENGE SURFACE PLATES

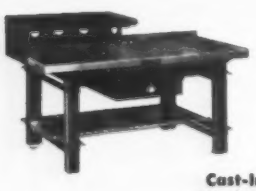
NEW! CLOVIS BLACK GRANITE
Rated Class A. Surface accuracy guaranteed.

FINE GRAIN SPECIAL ANALYSIS SEMI-STEEL
Precision ground or hand-scraped

STILL ONE STANDARD OF CHALLENGE QUALITY!



Semi-Steel Layout Surface Plates
High compressive strength . . . Low coefficient of expansion. 16 standard sizes, 6" thick — other sizes to order. Also available for sectional assembly into unlimited sizes.



Cast-Iron Top Work Benches
Four sizes, three styles. For individual use or on a continuous line. With self-contained storage facilities.

Other Challenge Precision Products:
Clamp Edge Layout Plates • Reading Tables • Lapping Plates • Welding Tables • Surface Plates • Bench Plates • Surface Plate Equipment.

See the full line of Challenge Clovis Black Granite and Semi-Steel Surface Plates in the new Challenge Catalog. Send for your free copy today!

786

Challenge®

THE CHALLENGE MACHINERY CO.
Office, Factories and Show Room:
GRAND HAVEN, MICH.

METHODS: Load Cells Measure Ore

Problem of gaging quantity of hot calcined ore being fed to electric smelting furnaces solved with load cells no larger than 1-gal jugs . . . Units easily installed.

Gaging the quantity of hot calcined ore in the bins from which it is fed into electric smelting furnaces presented a problem recently at a new smelting plant in southern Oregon. Principal factors in the problem were the height of the bin and the fact that its supporting structure has few structural members from which to support a scale.

Solution of the problem was the use of an electrical load measuring device of 100,000 lb capacity to support one side of each of two 50 ton bins. Although a single weighing device gives only a rough measure of the weight of the bin's contents when installed in this way, its purpose is only to indicate in the control room whether the bin is empty or full.

Load Cell Advantages

SR-4 load cells, developed by Baldwin - Lima - Hamilton Corp., Phila., satisfied this requirement because cells of 50 ton capacity are no larger than a one-gallon jug, were easily installed on the supporting structure, have no moving parts, measure the bin's contents without perceptible deflection under full load, and permit installation of the indicating instrument at any convenient point within 200 ft or more from the bin.

Mounting Described

The method of mounting the load cell is described as simple: a stirrup supported by four tension rods and a saddle over a horizontal member of the supporting structure. The load cell takes the bin load from a structural member attached to the side of the bin.

The ore is dried and calcined, then goes into the bin at a temperature of about 1000°F for delivery to the furnaces. Insulation in the bin walls shields the load cell from this heat. This method of gaging will eventually be used on four 50 ton bins, all load cells being connected into a single indicating instrument in the control room.

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 89. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

Handling:

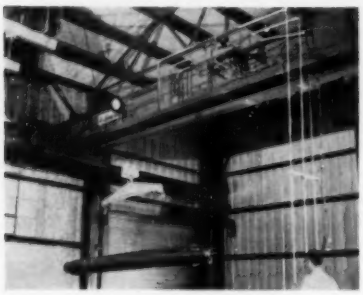
All-hydraulic overhead crane has variable speed control.

A completely hydraulic, 3 ton overhead traveling crane, believed to be the first ever built, has been designed and constructed as an experimental model by the Shaw-Box Crane & Hoist Division of Manning, Maxwell & Moore, Inc., Muskegon, Michigan. This crane has been operating for several months in a local plant requiring average industrial crane service. While this crane is controlled from the floor, it may be equipped with the usual operator's cage.

Apparent advantages of this new all-hydraulic crane are that it provides infinite variable speed under any load, requires far less

maintenance because the use of hydraulics has eliminated many of expensive parts and complicated mechanisms. Additionally, it is estimated that the cost of the all-hydraulic crane will be approximately 10 pct less.

Shaw-Box Div. engineers have designs completed for cranes up to and including 10 ton capacity, which range covers between 65 and 70 pct of cranes purchased. Whether or not designs will be developed for cranes over 10 ton capacity is dependent upon the reception of the all-hydraulic crane by industry.



All - hydraulic overhead crane spans 37 ft, lifts 3 ton.

Transport:

Newly designed Diesel engine locomotive announced.

A versatile new road-switching locomotive—the DL-701—powered by a new-design, 12 cylinder, 1800 hp Diesel engine has been introduced by Alco Products, Inc., Schnectady, N. Y.

Built for heavy duty freight, high speed passenger and yard switching service, the DL-701 is distinctive for its high hood line and angle - mounted number boards. The prototype unit was built with the long hood forward of the cab, but Alco will build the locomotive with the short hood forward—placing the engine behind the cab in forward motion —to conform to an individual railroad's specifications.

Four Electric Motors

The locomotive is equipped with four heavy-duty electric motors for traction. The weather-proof

When you buy Acme-Gridley
you get **SERVICE**
ANYTIME, ANYWHERE

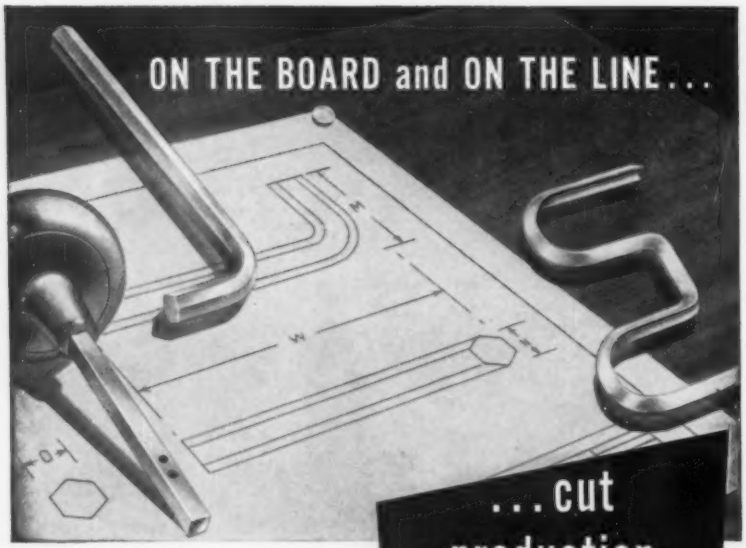
Dozens of Acme-Gridleys—the "heart" of mass production lines—idle in the smouldering rubble. When these machines had cooled down, they were sent to our plant where immediately upon arrival they were disassembled, new parts ordered from stock and machines then routed through our assembly line for reassembly and testing.

Within six weeks all but a few of these automatics were on their way back to the customer —ready once again to do their job.

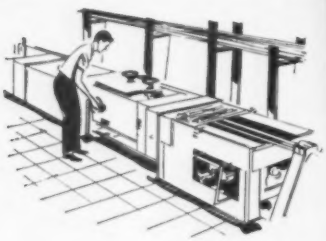
National Acme

The NAMCO nameplate on your machine assures service — in emergency or normal situations — when and where you need it.

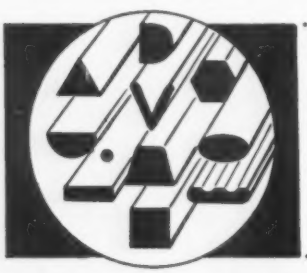
THE NATIONAL ACME COMPANY • 175 East 131st Street, Cleveland 8, Ohio



...cut production costs with CONTINENTAL® Special Shaped Wire



You can engineer greater savings in production when you use Continental round or special shaped wire. Usually you can reduce costs on expensive forging, stamping and rolling operations by using Continental special shaped wire. For product-trim or as a basic component, the right wire can help you cut corners—and you can get the right wire at Continental. We have solved countless problems in supplying wire for thousands of applications, in a great range of sizes and shapes, temper, finish and analysis in low or medium low carbon. Before you fill any wire need—check with Continental, wire headquarters for many firms. Write us today.



STANDARD AND SPECIAL WIRE SHAPES

flat	keystone-shaped
half-round	V-shaped
round	hexagonal
oval	grooved flat wire
half oval	special wire trim designs
square	bread-shaped
rectangular	D-shaped

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STEEL CORPORATION • KOKOMO, INDIANA

WIRE SPECIALISTS FOR OVER HALF A CENTURY

Producers of Manufacturer's Wire in many sizes, shapes, tempers and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, and special wire. ALSO, Coated and Uncoated Steel Sheets, Nails, Continental Chain Link Fence, and other products.

cab is roomier and has two fresh-air intake heaters for cold-weather comfort. Dial-type gages are spotted near control locations —permitting convenient operation of the unit in either direction.

The model 251 engine is turbocharged for increased power and has an air-intake aftercooler that

Turbosupercharged locomotive has structural improvements.

engineers say effectively reduces temperatures in combustion - affected parts. All working parts in the engine are enclosed to decrease wear, and a new fuel-injection system results in improved combustion.

Joining:

Structural metal-to-metal bonding adhesive described

Development of structural metal-to-metal bonding adhesive requiring little curing temperature is discussed in a report of Air Force research just released by the Office of Technical Services, U. S. Department of Commerce.

The report describes the testing procedures which led to the development of a room-temperature, low-pressure curing metal-to-metal adhesive suitable for the fabrication and field repair of certain airframe structural parts where the use of heating and pressurizing equipment would be impracticable or impossible.

Step-By-Step Presentation

Designated P-262A, the adhesive which was developed consists basically of methacrylic acid and methyl methacrylate and was

found to meet most of the research objectives. It possesses properties comparable to those required by Military Specification MIL-A-8331 (USAF). The report contains a step-by-step presentation of the development, formulation and processing, as well as a properties analysis of P-262A. Also covered in the report are details on the preparation of aluminum surfaces to make ready for the bonding operation.

This report PB 111764 *Development of Room-Temperature-Curing Structural Adhesives for Metals*, Bjorksten Research Laboratories, Inc., for the Air Force, July 1954, can be obtained from OTS, U. S. Department of Commerce, Washington 25, price $2.25.

Milling:

Cam stud fastener production increased 1000 pct.

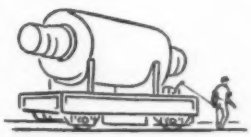
The problem of mass producing a precision locking cam stud fastener for hinged or removable covers on aircraft was recently solved by Townsend Mfg. Co. of Hartford. To insure positive locking under constant vibration it was necessary to keep the cam form, end slot, and cam release in precise relation to each other. Specifications called for heat treated steel blanks, with each piece individually milled. The average operator produced a finished piece every sixty seconds.

By using four Townsend automatic secondary operation machines, the sequence of operation being: side turning, milling the cam form, milling the end slot, and finishing the end mill cam release, an average sustained production rate of 10 to 12 pieces per minute was achieved.

Tend 8 Machines

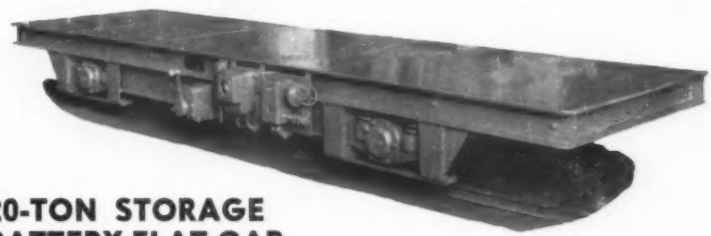
The complete cycle utilizing four machines requires only the loading of the hoppers and the replacement of cutting tools by the operator, who can tend as many as eight machines at one time. A high speed

ATLAS SAFETY TYPE

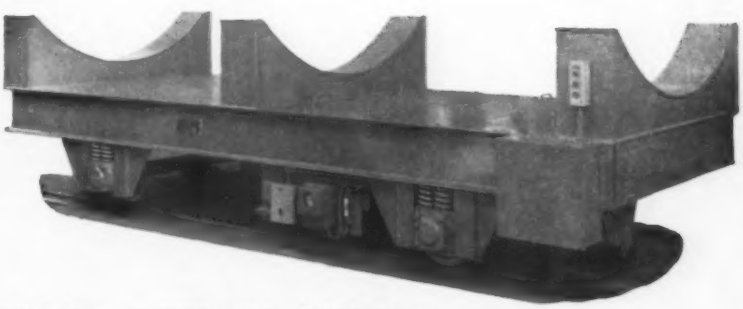


"SHORT HAUL" TRANSFERS

Atlas Safety-Type Transfers provide safe, low-cost service. Available with gas or diesel-electric, cable reel, or storage battery power. Atlas Transfers handle any type of load . . . and the heavier the load, the greater the savings.



20-TON STORAGE BATTERY FLAT CAR



20-TON STORAGE BATTERY WITH CRADLE FOR PIPE

Request "Walk-Along" Bulletin 1283

THE ATLAS CAR & MFG. CO.

ENGINEERS 1140 IVANHOE RD. MANUFACTURERS CLEVELAND 10, OHIO, U. S. A.

Ventilating Fan

ACCURATE BLANKS

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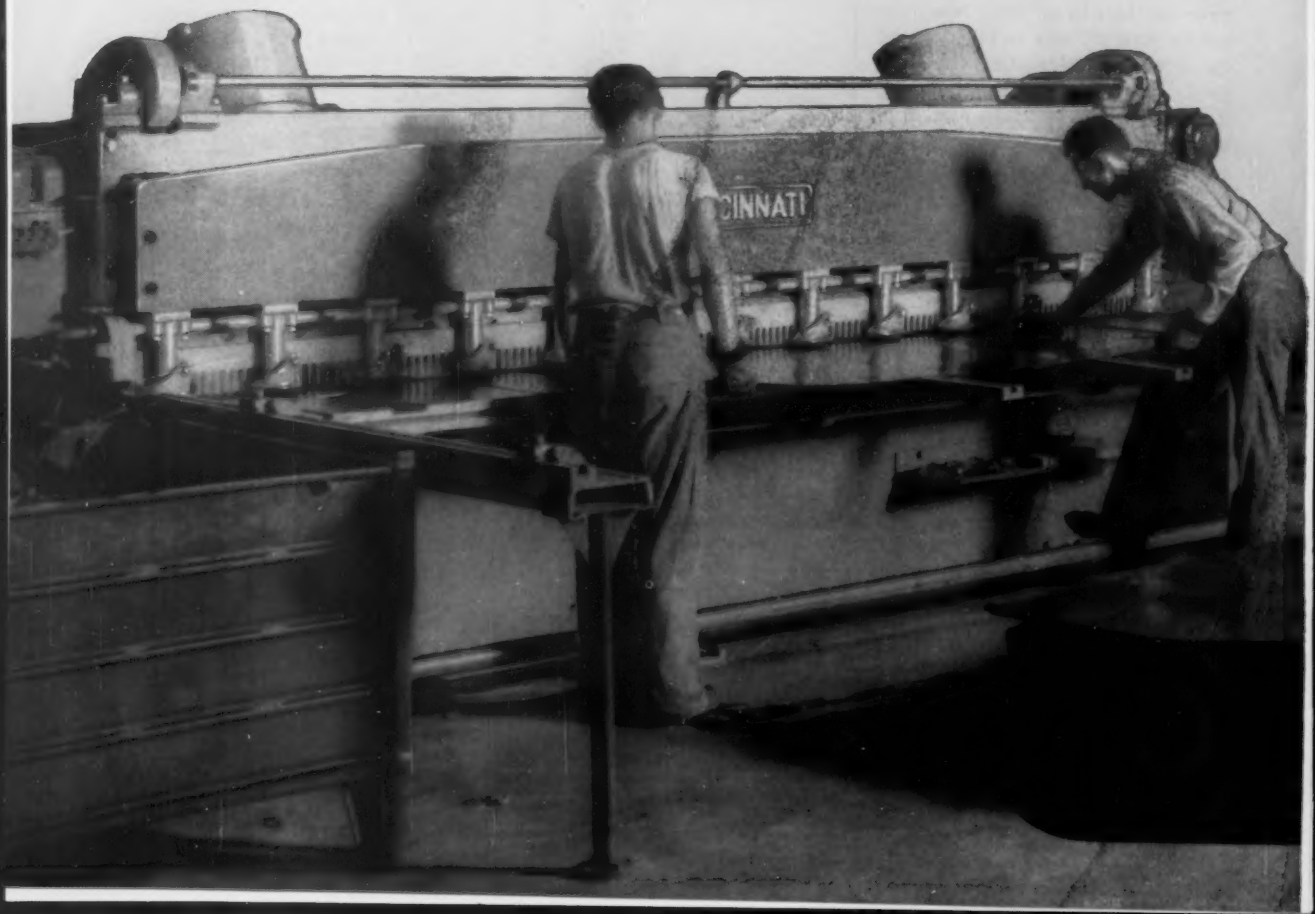
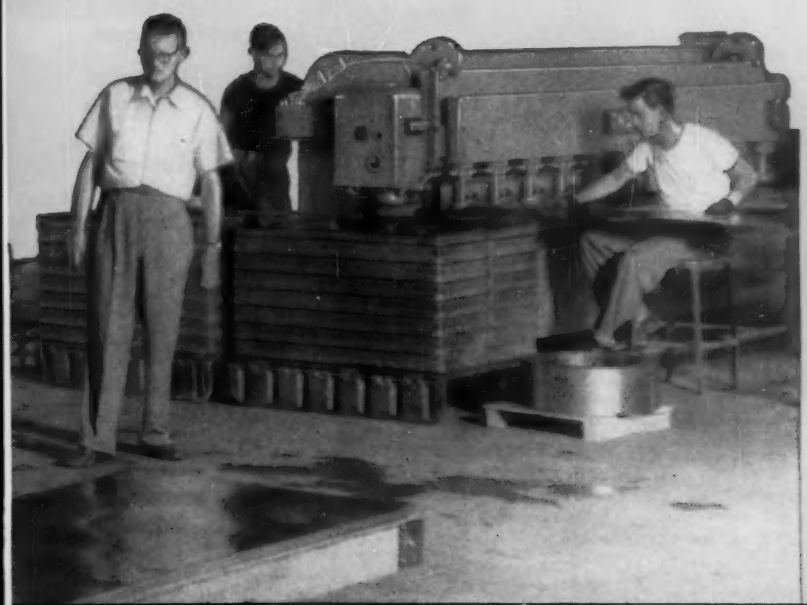


for all these products on Cincinnati Shears

Accurate blanks and strip stock of many sizes are sheared on these Cincinnati Shears at Nutone, Inc. The shearing operation eliminates costly dies, is flexible, rapid and economical.

One hundred and seventy-five tons of light sheets are sheared a month. Press operations are speeded and spoilage is at a minimum. The flexibility of the shearing operations take care of new products or changes in design with no tooling or special costs. Investigate these accurate Shears.

Write for catalog S-7.



Photos courtesy
Nutone, Incorporated,
Madison and Red Bank Roads,
Cincinnati 27, Ohio

THE CINCINNATI SHAPER CO.

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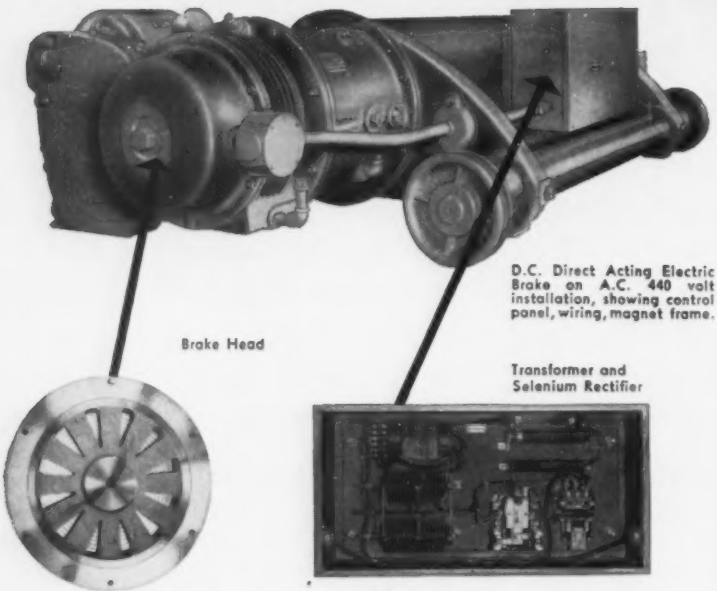
CINCINNATI

SHEPARD NILES

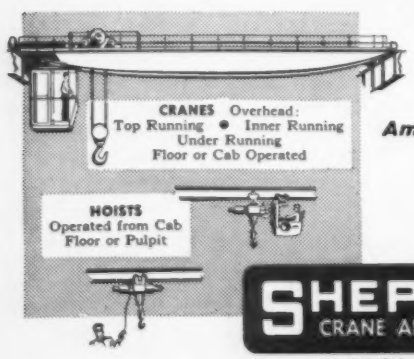
CRANE TROLLEYS & HOISTS with. . .

DIRECT ACTING BRAKES


D.C. Direct Acting Electric Brake on A.C. 440 volt installation, showing control panel, wiring, magnet frame.
Brake Head
Transformer and Selenium Rectifier

DIRECT ACTING BRAKES . . . are nothing new with Shepard Niles . . . we install them whenever heavy crane service is indicated. Our D. C. direct acting electric brake with Selenium rectifier for A.C. equipment has no lever mechanism to cause lost motion or wear. Very little magnetic clearance is required, thus eliminating pounding and wearing of brake parts. This type of brake is recommended for cycle duty for crane trolleys or for electric hoists where service demands this refinement.

Talk to your experienced Shepard Niles representative before you invest in a crane. He'll tell you whether the crane service your plant contemplates requires a direct acting brake.



While you're about it, send for Bulletin illustrating Shepard Niles Cranes.

America's Most Complete Line of Cranes and Hoists Since 1903

SHEPARD NILES
CRANE AND HOIST CORPORATION
1476 Schuyler Ave., Montour Falls, N.Y.

cutter was used with cutting tool replacement on all machines every 30 minutes. A standard cutting oil was used as the coolant.

The hopper blade automatically feeds the locking cam stud into a track, a pick-off finger mechanism removes the stud which is then

Four steps shown (l to r) turn steel blanks into cam stud.

chucked, supported by a steady rest. The specific steps and sequences are activated by the camshaft.

Experience has shown that with a 30-minute cutting tool replacement cycle rejects are practically nil, and the machines hold all finished parts within 0.001 in.

Metals:

Switch to weldrawn tubing cuts materials cost.

Automatic pilots for hot water heaters reportedly can be made from fushion welded, cold drawn tubing at a saving of 18½ pct of the cost without reducing the effectiveness of the tubes or impairing workability, according to Superior Tube Co., Norristown, Pa.

Kilroy Controls, Inc., Cleveland, a division of the Hot-stream Heater Co., reports this latest economy after a third change in tubing for its pilot tips. Each change has resulted in substantial savings in material costs.

The tubing now used is weldrawn Type 430, a 17 pct chrome stainless steel, manufactured by Superior, which had supplied all of the previous tubing used.

Kilroy first began to make pilot tip tubes from Superior's seamless Type 304 austenitic stainless steel tubing. In testing the weldrawn grade of Type 304 as a substitute,

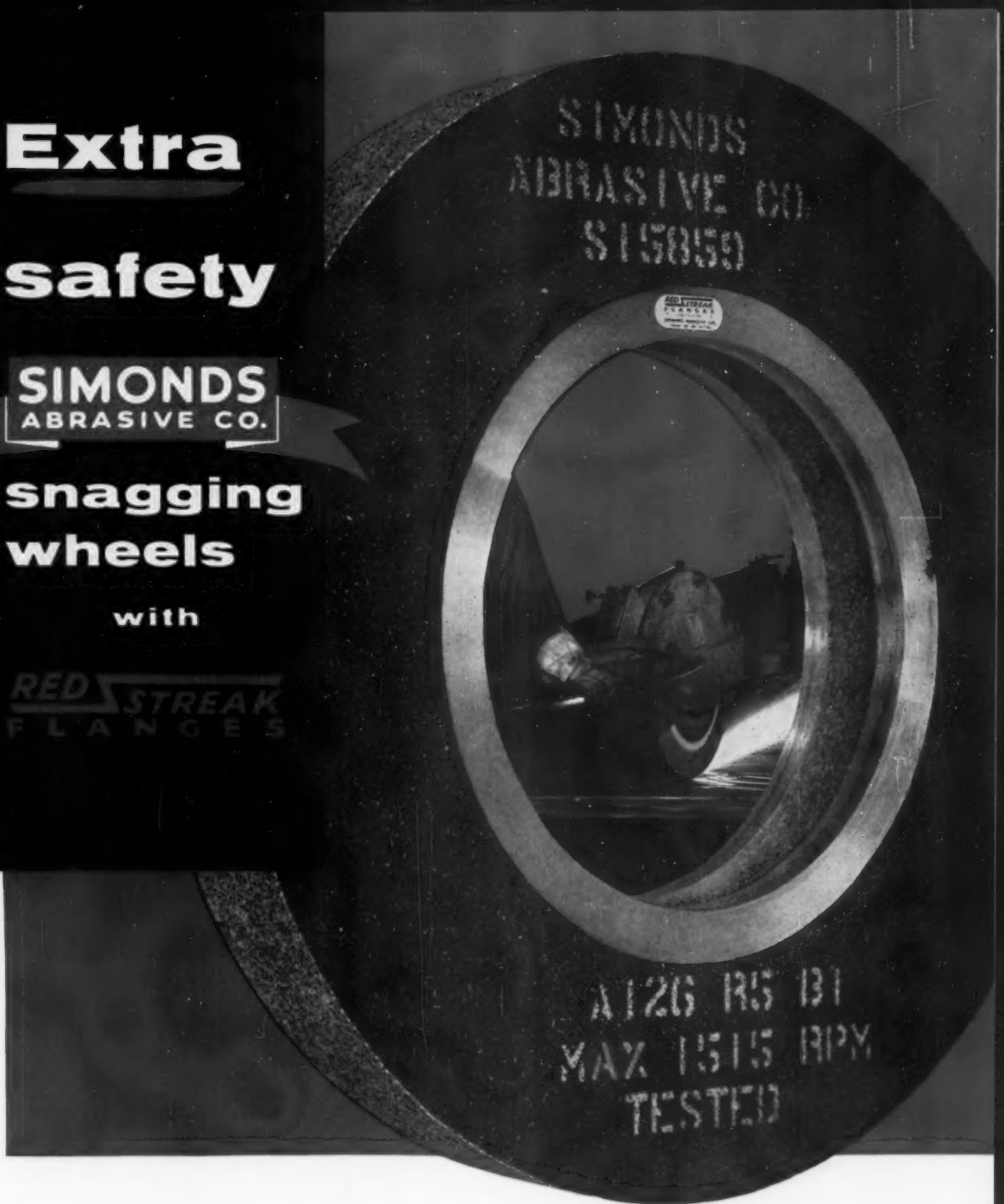
Extra safety

SIMONDS ABRASIVE CO.

snagging wheels

with

RED STREAK FLANGES



Strong, high-speed resinoid bonded wheels with built in circular steel flanges. Exceptional for fast stock removal, long wheel life and extra protection against radial cracking. Easy to mount. Accurate balance, true running for superior grinding action. In 6″, 10″ and 12″ hole sizes. Send for bulletin ESA—62.

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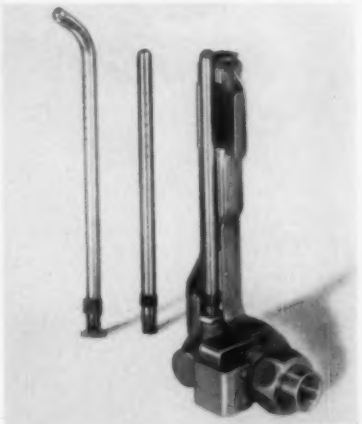
Division of Simonds Saw and Steel Co., Fitchburg, Mass.

Kilroy found that it would do the job equally well. The savings were comparable to those made in its latest change.

Does Not Burn or Corrode

Further investigation showed that Type 304 tubing was not really needed for this application because the flame and much of the heat rises upward away from the tube. The lower cost Type 430, with scale resistance up to 1550 degrees Fahrenheit for continuous service and 1600 degrees Fahrenheit for intermittent service,



Fusion welded, cold drawn tubing for pilot tips in heaters.

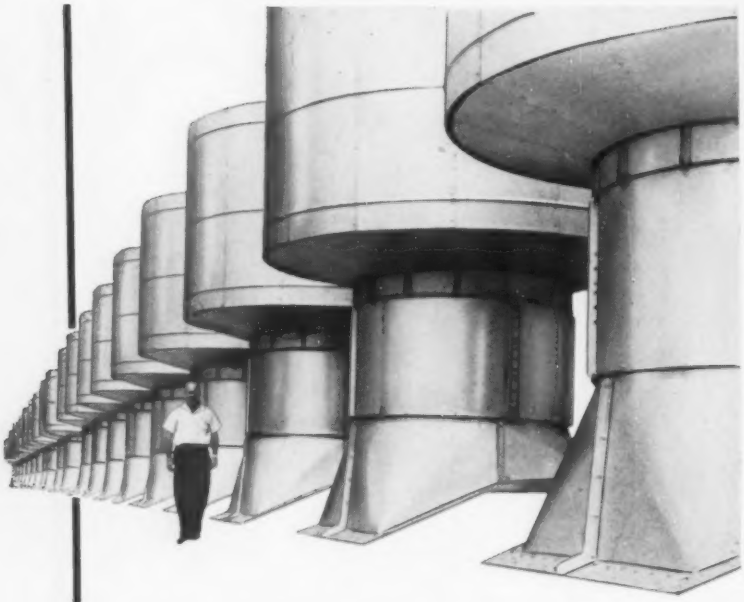
easily met the temperature requirements of the pilot tube application. Year-long tests have proved that the Type 430 safety pilot tip does not burn out or corrode and maintains an even flame.

Purchasing Cuts Cost

Since Type 430 is a 17 pct chrome stainless steel, it has the further advantage that it does not contain strategic nickel and, therefore, is not as likely to be restricted in use.

Cut in Lengths

Kilroy further minimizes tubing costs by purchasing it in random lengths of five to twenty-two feet. It cuts the tubing to the length required for the pilot tip tubes, spins one end closed, threads the other end, drills holes, and slits the spun end. Some tubes are also bent.



29 BURT FREE FLOW FAN VENTILATORS DO DOUBLE DUTY ON THIS STEEL PLANT

In this large steel plant, huge volumes of fumes and heated air must be exhausted during certain operations —lesser amounts during other production. Twenty-nine 72″ Burt Free Flow Fan Ventilators with individual capacities of 81,000 CFM meet *both* needs efficiently. Burt Axial Flow cast aluminum fan wheels powered by 15 HP, 860 RPM Class B insulated motors, with shrouds and ventilating tubes, supply adequate air movement at peaks. At other times, their high wind band design provides extremely high air handling capacity as a gravity unit without the fan operating. If YOU need fresh air at low cost, let Burt engineers suggest—without obligation —the Burt Ventilators to do your task best.

Send for **FREE** *Data Book!*

Write for Burt Data Book SPV-101-E. It supplies quick data on Burt's complete line of modern Room Ventilators

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...“the **PAYLOADER**®
came out way on top.
the two HA's with
roll-back buckets are
doing better than
⅓ more work than
machines without
roll-back action.”

(Signed) WILLIAM MCCAIN, *Foreman*
Ohio Stove Company
Portsmouth, Ohio

Best for your operations too!

...“believe the new
model HA
PAYLOADER®
the best machine
for our operations.”

(Signed) E. F. STOLPE, *Owner*
Penna. Malleable Casting Co.
Lancaster, Pa.

Foundries and metal-working plants far and wide are expressing their satisfaction with the performance of the new-design model HA “PAYLOADER”. Built to scoop-up and carry more material for its weight than any tractor-shovel near its class, the new HA is way ahead of the field in the *kinds* of work it can do — in the *amount* of work it can do.

Torque-converter drive; full-reversing transmission; 40-degree bucket tip-back at ground; closed, pressure-controlled hydraulic system with built-in shock absorber... these are but a few of the many tried and proven plus values in the new HA that contribute to its leadership in performance, low maintenance and long life. Your Hough Distributor is eager to show you what the new HA or a larger “PAYLOADER” can do for you.

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THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

For higher lifts and more production a bigger front wheel drive unit — model HAH 1 cu. yd. capacity.

THE FRANK G. HOUGH CO.
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- ☐ Send data on Model HA (1⅛ cu. ft.)
- ☐ Send data on Model HAH (1 cu. yd.)
- ☐ On larger models up to 2 cu. yd.

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No. 18
in a
Series

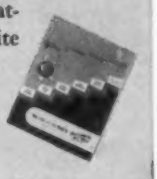
in Lansing, Michigan

4 out of 5 use

WHEELABRATOR®

STEEL SHOT

American businessmen know a good thing when they see it. The overwhelming preference for Wheelabrator Steel Shot is a good example. Take Michigan's capital city. Wheelabrator Steel Shot is used in 80% of all airless blast cleaning equipment. It is used in 4 out of 5 machines in Lansing because it gives lowest COST cleaning . . . lowest shot consumption, lowest maintenance and highest production. For instance, Lindell Drop Forge Company reports shot consumption decreased 50%, cleaning time shortened 25% and equipment maintenance sharply reduced. Whatever your cleaning problem, wherever you're located, you can save with Wheelabrator Steel Shot. Write now for Bulletin 89-B.



WHEELABRATOR CORPORATION

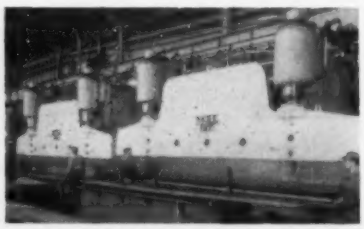
World's Largest Manufacturer of Steel Abrasives

510 South Byrkit St., Mishawaka, Indiana

Fabricating:

Large hydraulic press brakes form heavy steel plates.

Giant 1000 ton hydraulic press brakes in the Fabricating Plant of Armco Steel Corporation can take heavy steel plates and form them into construction product units in a matter of seconds.



Large 1000 ton press brakes form units in seconds.

They are said to be the largest brakes of their kind ever manufactured. Each brake is 22 ft long and can be used separately or operated in tandem as one 44 ft unit. Stroke is 18 in.

Some of the construction products fabricated on the huge brakes are Flex-Beam guardrail, interlocking steel sheeting, 4-flange tunnel liner, bridge plank, and extra long Steelox panels.

Materials:

Metal-plastic compound used in making molds, dies.

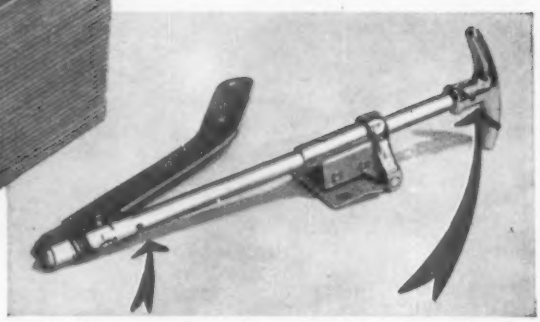
Devcon C—a combination of approximately 80 pct aluminum and steel and 20 pct plastic which can be poured or formed into any shape—is being used for making inexpensive plastic and rubber molds, embossing dies, tools, jigs and fixtures, for filling holes in castings, caulking around steel plates, and for many other applications where high strength at elevated temperatures is essential.

Easily Machined

The new product is extremely tough. It is lightweight and similar in many respects to aluminum. Devcon C has very good heat resistance and a compression strength of over 5,000 psi at 400°F,

3 Better Methods with ROLLPIN

TO REPLACE A RIVET Rollpin's spring action firmly fastened radio transformer laminations in place and did two things a rivet couldn't do—aligned the laminations and compensated for minor hole variations.



TO REPLACE A STOP PIN Rollpin's self-locking action eliminated staking or peening operations required to retain a straight solid pin.

TO REPLACE A SET SCREW on automobile brake handle, Rollpin is self-retained in the hand grip but can easily be driven into overdrilled hole in shaft to free handle, then removed and used again.

TO REPLACE A DRIVING PIN for a flexible drive shaft on a washing machine, Rollpin cut assembly costs by eliminating precision drilling and reaming

Where can you use this simple fastener?

If you use locating dowels, hinge pins, rivets, set screws —or straight, knurled, tapered or cotter type pins, Rollpin offers the opportunity of a better method that can cut assembly and maintenance costs. This slotted tubular steel pin with chamfered ends eliminates special machining, tapping, and the need for precision tolerances. Driven into a hole drilled to normal production standards, it locks securely in place, yet can readily be drifted out and reused whenever necessary.

ESNA

ELASTIC STOP NUT CORPORATION OF AMERICA

ROLLPIN TRADEMARK

MAIL COUPON FOR DESIGN INFORMATION

Elastic Stop Nut Corporation of America
Dept. R37-377, 2330 Vauxhall Road, Union, N. J.

Please send the following free fastener information:

- ☐ Rollpin samples
- ☐ Rollpin bulletin
- ☐ Here is a drawing of our product. What self-locking fastener would you suggest?

Name_____ Title_____

Firm_____

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GEAR PERFORMANCE to match the ever-increasing power and speed of modern machines is Fairfield's specialty. This is possible because Fairfield has constantly held a position of leadership in utilizing the most advanced methods, machines, and techniques for producing better gears. By keeping apace with modern engineering trends, Fairfield renders an invaluable service to many of the nation's leading machinery builders: *"Gear Performance Made to Order!"*

Users also get the advantage of Fairfield's *mass production economy* extending over a complete range of gears: Spiral Bevel, Straight Bevel, Hypoid, Zerol, Spur, Herringbone, Worms and Worm Gears, Splined Shafts, and Differentials. Available, too, are expert recommendations for any gear problem users may have. *Ask for interesting, illustrated bulletin describing Fairfield facilities.*

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with practically no shrinkage or distortion during hardening. Once hard, it is permanent and will not deteriorate or change. It can be drilled, ground, threaded or machined with regular metal working tools. It has good heat trans-

Devcon C is capable of being drilled, ground or machined.

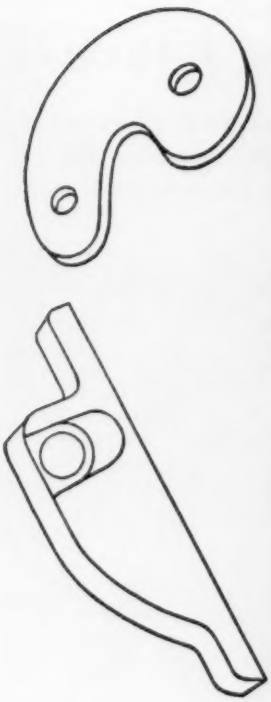
fer. Devcon C was developed by Chemical Development Corporation, Danvers, Mass., and is intended primarily as a low-cost method of making molds for the plastic, rubber and allied industries.

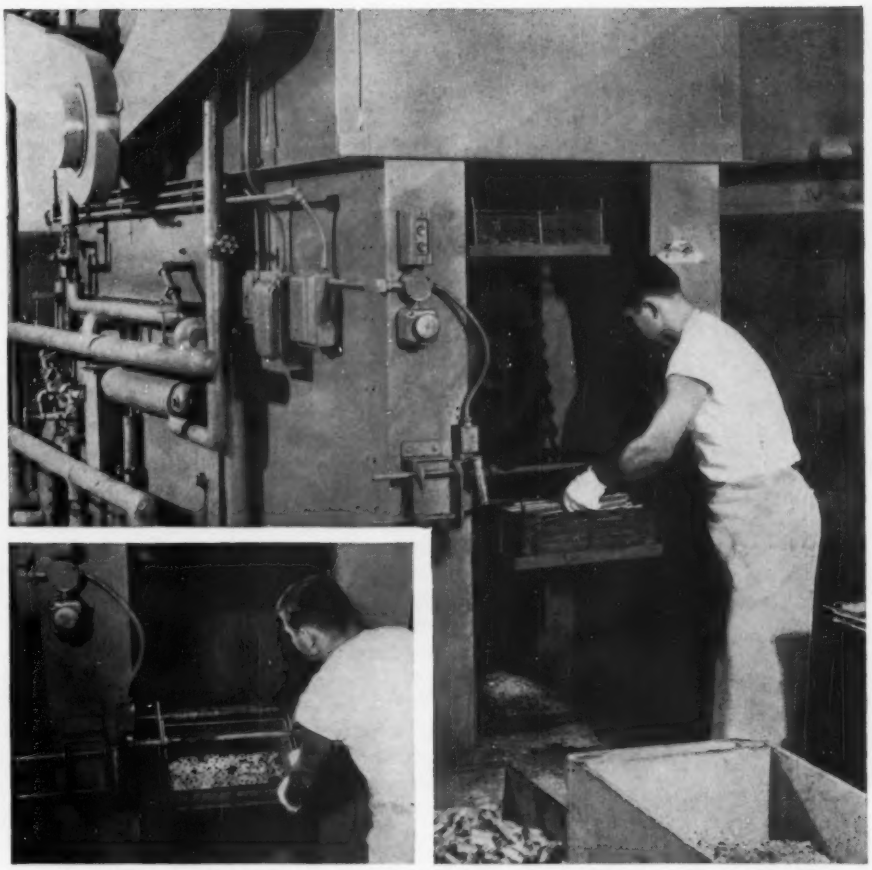
Non-Ferrous:

Pre-enameling process aids porcelain aluminum.

Known as the Alcoa R-100 Process, a patented chemical treatment to get porcelain enameled aluminum is described as simple, inexpensive and well suited to a continuous enameling operation by Aluminum Co. of America reports. The new conditioning treatment is said to eliminate multiple chemical baths and a prefiring operation, formerly necessary to insure controlled surface conditions.

When applied to aluminum, the R-100 Process will produce a uniform, conditioned surface in one step. The metal will then readily accept a porcelain coating. The process has passed laboratory tests and substantial savings in manufacturing costs are anticipated from its use.





CONVEYORIZED DEGREASER at Standard-Thomson Corp. is loaded by operator.

THOROUGHLY CLEANED with "TRICLENE" D in a single operation, parts are taken from the degreaser.

Standard-Thomson Corp. reports: "TRICLENE® D eliminates solvent-control worries...cuts degreasing costs"

Says George Mitchell, Chief Chemist

"We started using 'TRICLENE' D trichlorethylene over a year ago, and since then we haven't had a single concern about solvent condition. Our only control procedure is a pH check once a month, and we've noticed a reduction in rejects due to etching and staining."

Standard-Thomson, Dayton, Ohio, manufactures a variety of building hardware, automobile and aircraft accessories. They operate four vapor degreasers—three manual and one conveyorized. Since changing to "TRICLENE" D they've been able to eliminate bright dipping of brass parts, and have increased the time between degreaser cleanouts from two weeks to six weeks.

An exclusive combination of locked-in stabilizers gives "TRICLENE" D unequaled resistance to all major causes of solvent deterioration—heat, light, air, acids and aluminum chlorides. Yet Du Pont's rugged solvent contains no salt-forming inhibitors to stain or etch precision-machined parts. Even after repeated use and distillation, "TRICLENE" D retains its original high purity . . . continues giving efficient, trouble-free cleaning of any metal, job after job. And remember, it costs no more than ordinary solvents!

FOR MORE INFORMATION on "TRICLENE" D trichlorethylene, write to the nearest district office of E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Dept., Wilmington 98, Delaware.

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STAMPINGS
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QUANTITY PRODUCTION OF GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

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CHATTANOOGA 2, TENN.

BONDING: Find New Adhesive

Recommended for contact and hot bonding, elastomeric type adhesive is reported to have a high adhesion to steel . . . Peel strength is described as double that of other bonds.

A new elastomeric type adhesive for contact and hot bonding a wide variety of porous and nonporous surfaces is now available from the Adhesives & Coatings Div., Minnesota Mining & Manufacturing Co. Called EC-1357, the adhesive can be used in bonding metal frames to veneered plywood, aluminum sheets to aluminum channels and decorative plastic laminates to metal counter and table tops. It can also be utilized as an adhesive for sandwich construction, in which aluminum sheets are bonded to impregnated Kraft paper honeycomb.

High Adhesion to Steel

The EC-1357 material has a rapid strength buildup rate, high adhesion to steel, high softening point, good sprayability and excellent resistance to plastic flow. When used as an adhesive to bond honeycomb structures, EC-1357 is said to provide about double the peel strength of similar structures fabricated with resin-type adhesives.

Production hot bonding of parts with EC-1357 elastomeric adhesive can be accomplished with relative ease and speed. Surfaces of parts to be bonded are chemically cleaned and the adhesive applied with a hand roller or by spraying with conventional spray equipment. Then the adhesive is dried with infra-red heat.

Plastic To Metal Use

The parts can then be hand assembled and bonded while hot by one pass through a pressure roll. Air drying methods can be used in conjunction with hand rollers for low-production bonding with EC-1357. This adhesive can be effectively used in contact bonding decorative plastic laminates to metal counter and table tops. When used in contact bonding a liberal and uniform coat is applied to the back of the laminate and base surface.

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 89. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

Pulling back metal side to show peel strength of adhesive.

Hardfacing:

Fast deposit rate claimed for magnetic alloy additives.

A family of highly-concentrated magnetic alloy additives that reportedly produce high-hardness deposits of extremely high alloy content faster and requiring less application skill than other methods, have been developed by Western Carbide Corp., No. Hollywood, Calif. Designed for semiautomatic or automatic operation, the ad-

ditives are applied with a dc welder wire feeder and magnetic hopper combination.

Cuts Welding Costs

According to its developers, this magnetic alloy has the fastest known rate of deposit of any hardfacing material (20 to 40 lb per hr). It may be deposited at a rate of 5 to 6 times faster than hand welding and 2 to 3 times faster than other automatic methods. The product, magnaloy, cuts welding labor costs from 30 pct to 50 pct, and lowers material costs up to 40 pct, compared with hand welding using arc rods of comparable composition. It can be applied to a wider range of base metals and is described as requiring much less operator skill than hand welding using arc rods. Compared with other automatic welding methods, it provides a stable arc and is virtually smokeless.

Application Described

Magnaloy is used as follows: A wire-feeding machine automatically feeds the wire at the same rate that it is consumed. Low carbon wires in diam of 5/64 in., 3/32 in., or ⅛ in. may be used but higher carbon wires can be used if exceptional hardness is desired. With the wire in place, the hopper is filled with the proper grade of Magnaloy for the job.

Since the alloy additive and wire are fused, a higher amperage setting is required than when lighter fluxes are employed. Under normal operating conditions with a 400 amp. dc welder, the weld deposit rate ranges from 20 to 40 lb per hr.

When an arc is struck, the current through the wire creates an electro-magnetic field which holds the Magnaloy to the wire. An orifice at the bottom of the hopper controls the thickness of the Magnaloy coating on the electrode wire. In this way, the wire becomes a coated electrode surrounded by alloy additives, arc stabilizers, and flux.

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Now LEADED!
Now you can obtain the advantages of leaded 52100 Steel in round bar stock. The presence of lead acts as a lubricant, resulting in freer machining, quicker, cleaner cutting, better finishes and longer tool life. All these advantages are conducive to greater production at reduced costs.
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UNION, NEW JERSEY
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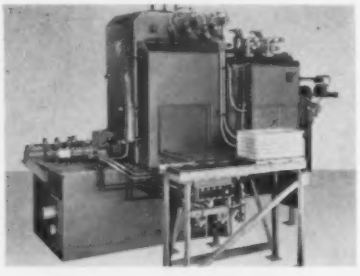
NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies . . . for more data use the free postcard on page 89 or 90.



Automated, batch-type furnace simplifies handling

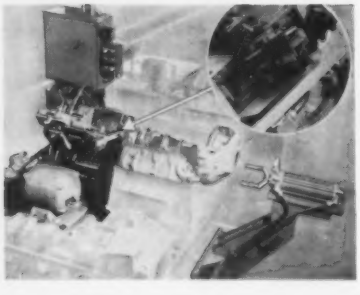
An automated, controlled atmosphere, batch-type furnace, first in a complete line, automatically preconditions, loads and unloads the work chamber, and quenches the processed charge without operator handling and loss of valuable process time. Featured on the furnace are such features as pressurized operation, double elevator and automatic transfer mechanisms. Also has gross heating rate of 800 lb per hr, temperature range of 1450 to 1700°F and an oil quenching system for carburizing, carbonitriding, carbon restoration and clean hardening. *Dow Furnace Co.*

For more data circle No. 34 on postcard, p. 89

Independent station operation offered on borer

A new vertical unit for multiple boring operations allows continuous production to be maintained by loading one station while the other is boring, since each station may be independently operated. In the setup pictured, multiple tool blocks are mounted on horizontally positioned hydraulic slide units which in turn are positioned on vertical slide units, also hydraulically powered. This bi-way slide arrangement is for boring, chamfering and facing automotive transmission parts, the vertical slide movement accomplishes the boring and chamfering and the horizontal slide movement generates the face. Capacity of the unit ranges to parts having diam of 16 in. *Heald Machine Co.*

For more data circle No. 35 on postcard, p. 89



Hydraulic marking unit designed for automated lines

A new hydraulic marking unit has been especially developed for operation on automated production lines. The unit, shown on an automobile engine assembly line, begins its cycle after receiving a signal from the master control panel and also from the work piece in the proper station. The work cycle, which consumes 8 seconds, consists of clamping, marking, automatic indexing of numbering head (as shown in insert), unclamping and recording engine serial number on a continuous paper tape. After cycle completion, signal goes to control panel and work is moved out of station. *Cadillac Stamp Co.*

For more data circle No. 36 on postcard, p. 89

Power press feed has improved features

An improved micro-air power press feed is described as including centrally located controls; increased speed of carriage from 1 fps max to 1½ fps at 100 psi; spring loaded grease cups and lead screw permitting adjustment of feed length while machine is in operation. *Nadel Tool & Mfg. Co., Inc.*

For more data circle No. 37 on postcard, p. 89

Flexible seamless aluminum tubing provided

A new size, 2 in. ID flexible seamless aluminum tubing has been produced with an OD of 2 15/16 in. and a thickness of metal of 0.022 in. The illustration shows a unit with open pitch convolutions and integral cylindrical ends whose overall length is 9 in. Greater lengths can be supplied up to 10 ft. Special end connections on request. *Seamlex Co., Inc.*

For more data circle No. 38 on postcard, p. 89

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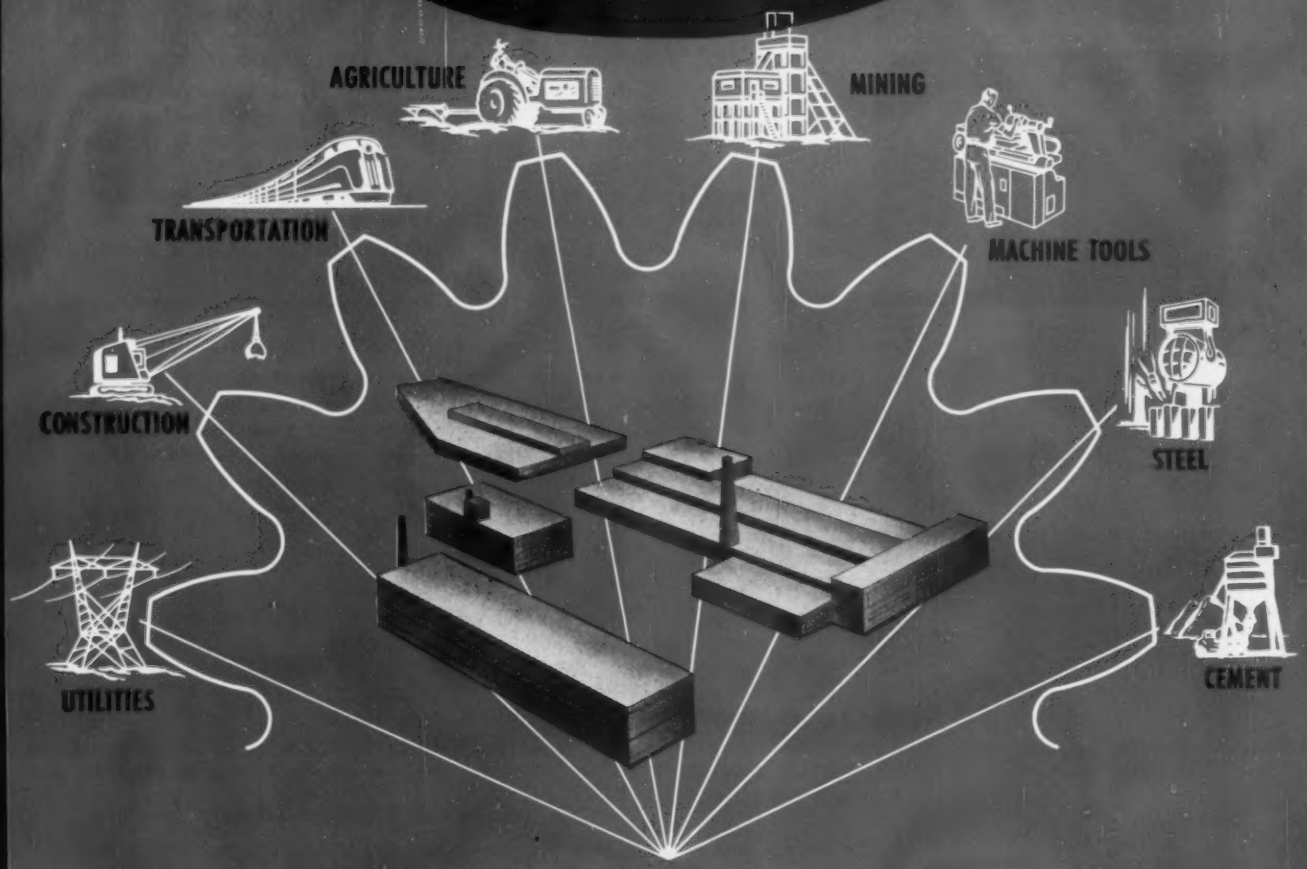

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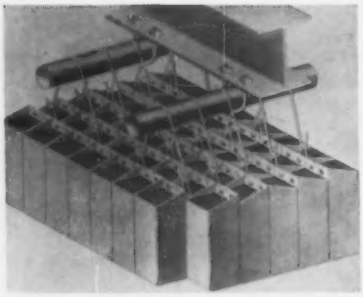
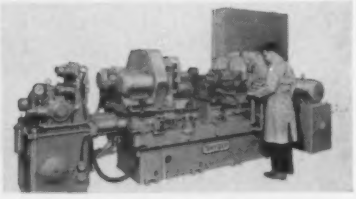


Advantages cited for new open hearth roof suspension

A new suspended metalcased basic brick roof incorporates a method of suspension in which the tiles are supported from the casings entirely outside of the refractories. They are eccentrically supported so as to cause the tiles to abut each other, thus eliminating air infiltration between the adjacent tiles. Air infiltration is the primary cause of metal casing growth. In this roof support no castings are used and no supports are embedded within the refractory proper. By this eccentric method of support, tension springs are not necessary, but can be used if already installed. Non-oxidizing metal seal used on tile squares. *Geo. P. Reintjes Co.*

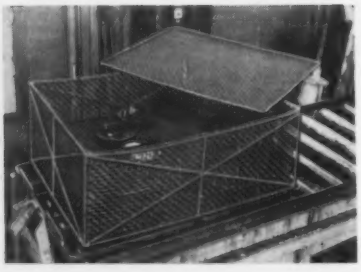
For more data circle No. 39 on postcard, p. 89



Unit finishes parts with variety of bore sizes and centers

Capable of finishing nineteen different semi-mass produced parts with a variety of bore sizes and center distances, a versatile new 8-spindle, two-way precision boring machine is announced. Finished part can be produced in an automatic cycle in 50 seconds floor-to-floor time on the electrically-operated hydraulically controlled machine. *Snyder Tool & Eng. Co.*

For more data circle No. 40 on postcard, p. 89



Furnace work basket permits easier handling

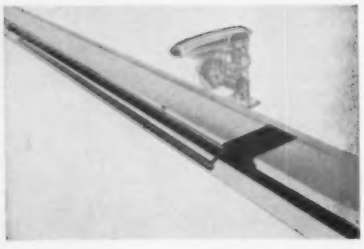
A custommade furnace work basket permits easier handling of small parts during the heat treating process. The basket, made of Alloy No. 330 (35 pct nickel, 15 pct chromium), prevents small parts from falling into the furnace. The advantage is described as the fact that the basket allows parts in all shapes and sizes to be put into the carrier, together with the capacity load of 500 lb. Basket is 32½ in. x 24 in. x 12 in. deep. Framework is ½ in. diam rod. Furnished with work separator screens fitting loosely in basket. *Wiretex Mfg. Co.*

For more data circle No. 41 on postcard, p. 89

Steel firm produces polyvinyl chloride pipe

Described as the first non-metallic products ever supplied by the firm, one steel company is now marketing rigid unplasticized PVC (polyvinyl chloride) pipe. They are providing a normal impact grade with high chemical resistance and a high impact grade with slightly less chemical resistance but much greater strength. *Alloy Tube Div., Carpenter Steel Co.*

For more data circle No. 42 on postcard, p. 89



New cut-off gage designed to save time and material

An improved style of a cut-off gage, known as Model 6, is made extra sturdy for heavy duty cutting. It is of heavy steel construction and built to resist weather conditions for inside and outside use. The unit is available for tables ranging in widths from 8 in. to 18 in. According to the maker, any length up to nine feet may be set and the stop positively locked in position in a matter of seconds. Stops available for multiple and angle cutting. *Snow Mfg. Co.*

For more data circle No. 43 on postcard, p. 89

Air grinder has improved grip feature

An air grinder, designed for use in foundries and other metal working operations, has grip handles which are spaced 110 deg apart rather than the conventional 90 deg. Product designers believe that this change will heighten operator convenience and hence increase efficiency. Unit is being made available in speeds of 4500, 6000 and 8000 rpm. Unit has automatic oiling; double-row spindle bearings. *Thor Power Tool Co.*

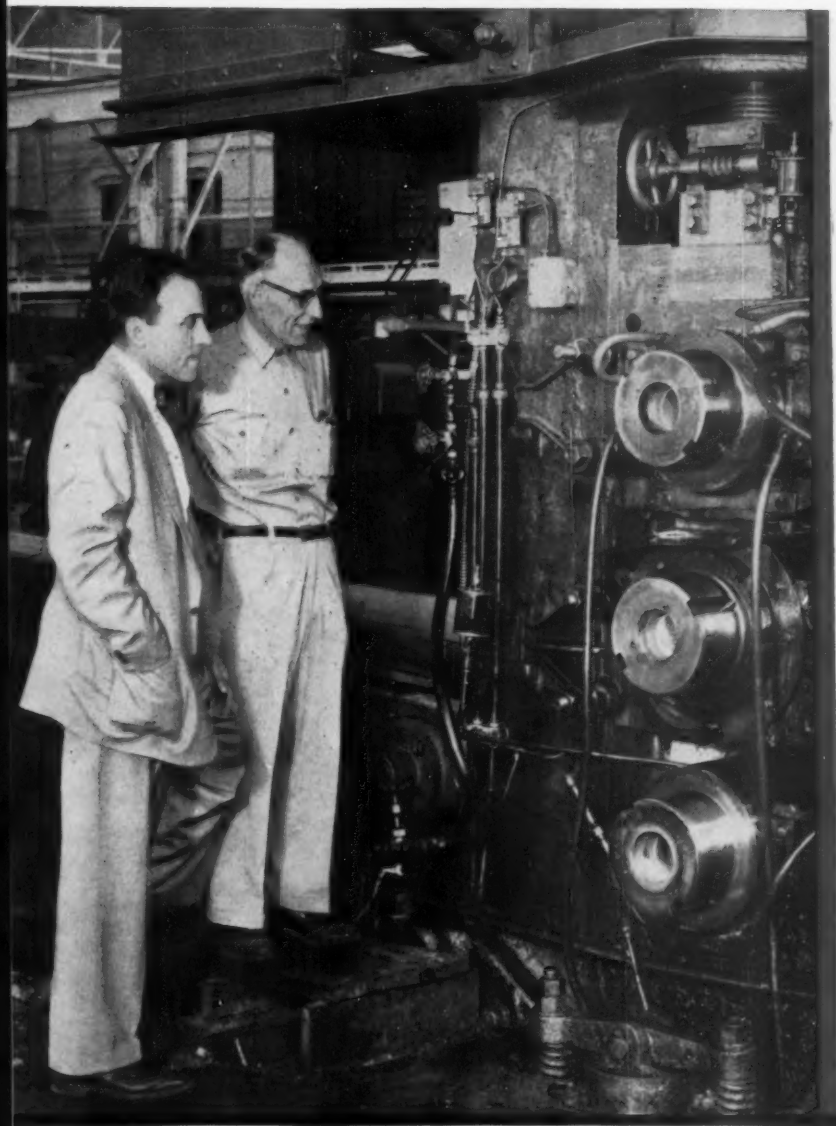
For more data circle No. 44 on postcard, p. 89

New, longer 8000 lb industrial trailer offered

Designed to give the advantges of longer width with resultant increased carrying area and an improved trailer hitch, a new trailer has a one-piece checkered steel plate carrying platform of 128 in. in length. *Yale & Towne Mfg. Co.*

For more data circle No. 45 on postcard, p. 89

Sick slab roll recovers fast with application of STANOGEAR *Compound*



A slab roll at Matthiessen & Hegeler Zinc Company, La Salle, Illinois, was sick. It suffered from repeated roll neck bearing failures. Bearing temperatures couldn't be controlled. A consultant was summoned—Marshall J. Fox, Standard Oil lubrication specialist. His diagnosis and remedy: Install STANOGEAR Compound and equip the machine with a central pressure system for application. Recommendations were followed. Result: No bearing failures, due to faulty lubrication, since. Maintenance costs reduced. Time lost through breakdowns slashed.

This was a condition made to order for STANOGEAR to remedy. And Matthiessen & Hegeler knew there was a man at hand who could suggest what should be done. It's another demonstration of what this unbeatable combination can do when put to work:

1 **Standard Oil lubrication specialists capable of giving technical help.**

2 **Top quality products *that deliver results required.***

STANOGEAR Compounds contain special additives making them suitable for applications where heavy loads cause welding, seizure or scoring.

In the Midwest and Rocky Mountain states, a Standard Oil lubrication specialist in your nearby Standard Oil office will gladly give you more information about STANOGEAR. Call him. Or contact Standard Oil Company, 910 So. Michigan Avenue, Chicago 80, Ill.

Eugene Ewald (right), Mill Foreman, and Marshall Fox, Standard Oil lubrication specialist, inspect slab roll. STANOGEAR Compound helped solve lubrication problem on roll neck bearings.

Marshall Fox who proposed switch to STANOGEAR with resultant improved operation, is experienced in providing such technical service. Marsh has a Mechanical Engineering degree from Purdue to qualify him for this work. In addition, he has completed Standard's course for sales engineers. This experience and training, customers find, pay off *for them.*

STANDARD

STANDARD OIL COMPANY

(Indiana)

DURASPUN

20-FOOT FURNACE ROLLS
Centrifugally Cast

. . . of Duraloy HH Alloy, one of the most widely used high chrome, medium nickel alloys.

Two items concerning these furnace rolls may be of particular interest:

a—the size: 20 feet long—14" OD, ¾" wall thickness

b—welding operations by which reducing cones and shafts (both statically cast of the same alloy) were welded to the centrifugally cast rolls

These two items will serve to emphasize two phases of our service: (1) the large size centrifugally cast tubes we are able to produce and (2) our machining and finishing facilities, including welding.

Our new 16-page general Bulletin — 3354-G — gives complete details. Would you like a copy? When writing or calling would you mind telling us the general nature of your high alloy casting requirements? Better yet, if you have specific requirements on which we could help, let us have the details.

THE DURALOY COMPANY
OFFICE AND PLANT: Scottdale, Pa.
EASTERN OFFICE: 12 East 41st Street, New York 17, N. Y.
DETROIT OFFICE: 23806 Woodward Avenue, Pleasant Ridge, Mich.
CHICAGO OFFICE: 332 South Michigan Avenue

Compensating chuck

A new type compensating chuck, described as a chuck with "true" equalization, is announced. The advance in styling is said to be due to reducing friction and simplifying the number of parts that compensate. Advantages listed for the unit are: its ease in changing from one diam to another; the fact that it will operate equally well with the

machine running or stopped, allowing automatic loading and unloading; the compensating mechanism increasing the gripping power which permits more rapid stock removal; the center which can easily be set dead true; and the compensating chuck which can also be used as a standard power chuck when required. *Buck Tool Co.*

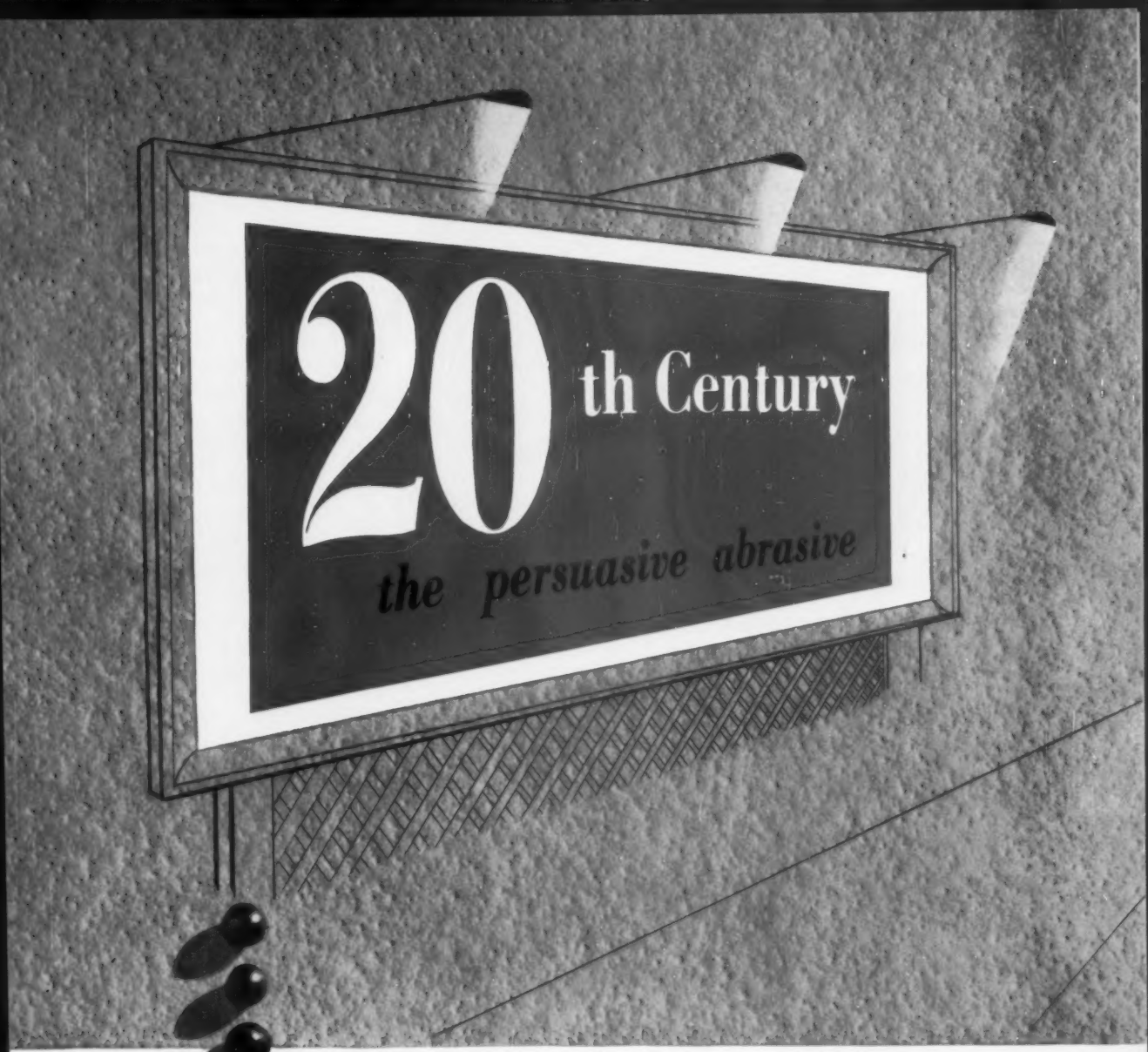
For more data circle No. 46 on postcard, p. 89

Lift foot pedal

Addition of a foot pedal lifting mechanism, requiring only a few strokes to raise forks from 3¼ in. lowered position to 5½ in. max lifting height, has improved a hydraulic pallet lift. The load is

raised to a level position by the use of six lifting cams. Lift has 2250 lb capacity, while fork length is 54 in. Shipping weight—290 lb. Maintenance said to be simplified by using standard type hydraulic jack. Alemite fittings used and unit has roller and ball bearings. *Pallet Vault Corp.*

For more data circle No. 47 on postcard, p. 89



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It's your assurance of premium quality metallic abrasives for any cleaning or peening requirement. Choose our *Normalized line, for example, which lasts as much as four times longer than other abrasives. Or our Toledo Realsteel, produced in our new Toledo Steel Shot Division, for consistently high uniformity.

Remember, when you buy 20th Century, you buy top performance.

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One of the world's largest producers of quality shot and grit — Hard Iron — Malleable (*Normalized) — Cut Wire — Cast Steel (Realsteel)
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Men would not accept either idea at first . . .

INSERT CHASERS SAVE UP TO 33%

Insert chasers are like safety razor blades: they cost so little that you can throw them away when dull. Or, for utmost economy, you can resharpen them over and over again. Only a flash grind is required. For less than $40 you get a dozen sets of ¾–16 insert chasers, each set ground ready to go. You will be amazed at the quantity of threads they will cut, even to Class 3 specifications, with a minimum of downtime. FREE: "Selecting the Proper Die Head for the Job"

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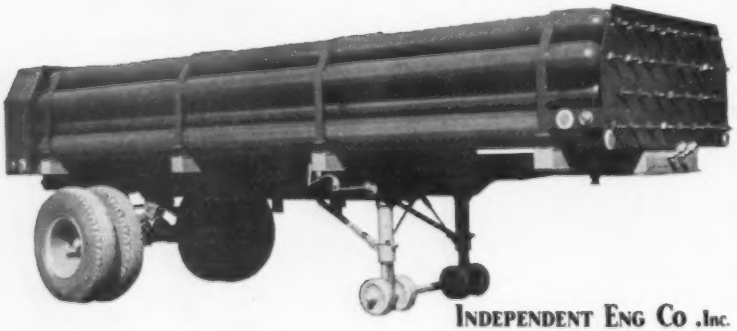

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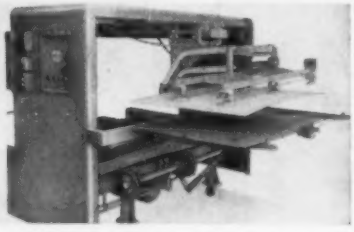
Sizes and weights to meet all State requirements.

Can be mounted on bases for permanent storage.

Sheet feeder

A new sheet feeder, added to a line of equipment for feeding, pulling and positioning parts at the die press in heavy metal stamping operations, is a standard basic unit which feeds a single sheet of steel to a punch press reportedly 100 pct automatically. Air operated with 110 v. electrical controls, the machine is capable of handling up



to 30 steel sheets a minute, depending upon the size of the blank. It will take sizes ranging from a blank of 8 in. in diam to a sheet of 48 in. by 144 in. The feeder is self contained and completely movable. Its controls can be interlocked with those of the presses and with those of its sister units. *Hamilton Automation, Inc.*

For more data circle No. 48 on postcard, p. 89

Switch

For use in operations requiring extreme sensitivity, a new Type-10 switch offers movement differential less than 0.0005 in. The snap action of the switch is described as giving more than 10,000,000 actuations in tests. The manufacturer states that the serpentine switch

mechanism largely eliminates the problem of switch fatigue. The switch has a 20 amp rating and the manufacturer reports it is adaptable to use in machine tools, appliances and other in-plant uses. Seven types of plunger, spring and lever actuators are available. Illustrated is pin plunger. *Illinois Tool Works.*

For more data circle No. 49 on postcard, p. 89

Hundreds of New Stock Sizes SIMONDS Flat Ground DIE STEEL

Widest Selection Ever Offered

Now you can get hundreds of new stock sizes of Simonds high-grade, precision-ground tool and die steel. Sizes that formerly were special are now available from stock at regular prices. Sizes you asked for to help you save time and money. "1001 sizes for 1001 uses" in either OIL or AIR Hardening type steel.

OIL HARDENING TYPE — Non-deforming, spheroidize-annealed for best machinability and consistently uniform hardenability — from Simonds' own steel mill. Extra-smooth finish with all decarburization and surface defects removed. Wide hardening range. Individually packaged (18" and 36" lengths) with simplified heat treating instructions.

AIR HARDENING TYPE — Non-deforming, spheroidize-annealed, 5% chrome — more wear-resistant yet easy to machine and heat treat with uniformly excellent results — another product of Simonds' steel mill. Extra-smooth finish with all decarburization and surface defects removed. Wide hardening range. 36" lengths. Individually packaged with heat treating instructions.

FREE WALL CHART Ask your Simonds Distributor for a copy of this New Chart (18" x 31") giving full range of Stock Sizes now available.

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Heller Tool Co., Newcomerstown, Ohio
Simonds Abrasive Co., Phila., Pa., and Arvida, Que., Canada

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SET-UP *and* **HOLD-DOWN TOOLS**

ARMSTRONG Set-up and Hold-down Tools reduce setting-up time—keep men and machines producing. Designed for use on planers, drill presses, milling machines, etc., they hold work securely and rigidly, and thereby reduce spoilage and prevent costly accidents. Your local Armstrong Distributor carries ARMSTRONG Set-up and Hold-down Tools in stock in sizes for every operation. Stop haphazard setting-up methods. Provide each of your machines with a full complement of ARMSTRONG Set-up and Hold-down Tools.

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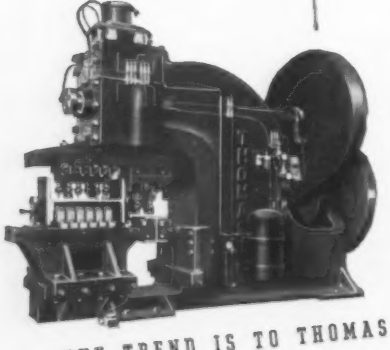
BEAM PUNCHING

without tool change



THE newly designed Thomas Beam Punches are built in sizes to handle beams up to 12"-18"-24"-30" and 36", web and flange punching, with a single tool set-up. Any of the five sizes may be used with or without a Thomas spacing Table, depending on production needs.

THE TREND IS TO THOMAS

THOMAS

MACHINE MANUFACTURING CO.

PITTSBURGH 23, PA.

• *Write for further information*

PUNCHES • SHEARS • PRESSES • BENDERS • SPACING TABLES

51 a

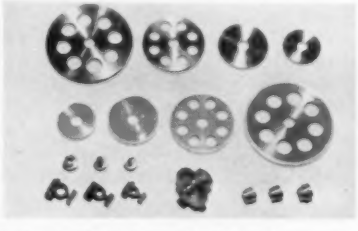
X-ray radiography unit

A new X-ray radiography unit is designed specifically for rapid inspection of welds, pipe lines, power plant, ship and aircraft equipment. The equipment is constructed with the X-ray tube and high tension generator completely enclosed in one unit. Maximum high voltage output is 260,000 v, minimum is 100,000 and a stepless control permits smooth variation between these limits. The unit has a fine focus of 1.5 mm providing radiographic detail. Tube and generator assembly has a diam of only 9 in. and is only 41½ in. long. It weighs only 230 lb and is waterproofed for outdoor operation. *North American Philips Co., Inc.*

For more data circle No. 50 on postcard, p. 89

Spur gear blanks

A line of precision spur gear blanks are available in 303 stainless steel — clear passivated or 24ST aluminum, chromic acid anodized (before cutting). Gears are cut to AGMA precision tolerance. Gears are stocked in 48, 64, 72 and 96 pitches, 20° pressure angle, with 14½° pressure angle available on request. *Pic Design Corp.*



For more data circle No. 51 on postcard, p. 89

8 Years of maintenance-free super corrosion resistance!

and *Carpenter* Stainless No. 20Cb is still on the job!

• Pickling tanks made of wood, acid-proof cement and other stainless steels met with little success in coping with the severe corrosion of hot sulphuric acid solution. Then Carpenter Stainless No. 20Cb was given a try.

Now, after eight years of almost constant two-shift use, this special sulphuric acid-resisting alloy still shows no need for maintenance. The tank contains 4 to 8% sulphuric acid solution at temperatures up to 165°F and is used for galvanizing sheet metal products.

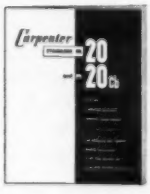
If you build or use equipment handling concentrations or solutions of sulphuric acid or other highly corrosive acids, liquids or gases, see why Carpenter Stainless No. 20 and No. 20Cb can help you cut corrosion costs. These super corrosion-resistant alloys are available in tubing, pipe, sheet, plate, bars, strip, wire and billets.

Call your nearest Carpenter Distributor or Branch Office for full information and help.

MEMBER

The Carpenter Steel Company, Alloy Tube Division, Union, N. J.

Export Dept.: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"



Ask for a copy of the Carpenter Stainless No. 20 and No. 20Cb handbook.

Carpenter

more than corrosion resistance

Stainless Tubing & Pipe

corrosion problem on your MIND?

then SPECIFY ATLAS

Throughout the industry, ATLAS means COMPLETE CORROSION PROTECTION. In construction of all types of plant equipment and facilities where corrosives are present, Atlas materials of construction are used to provide long term, low maintenance service.

Atlas can help you with your problems with on-the-spot technical advice, engineering and design assistance, highest quality corrosion proof materials and construction services from beginning to end.

For data on corrosion proofing of any of the items listed below or on any other pieces of plant equipment, contact Atlas . . . first in complete corrosion service. . . .

PLANT CONSTRUCTION

ceilings	manholes	sumps
curbing	piers	trenches
food plant floors	pits	walls
industrial floors	stacks	waste lines

PLANT EQUIPMENT

chemical tanks	fume exhaust systems	storage tanks
continuous picklers	pickling tanks	tank trailers
dip baskets	plastic pipe systems	tumbling barrels
fume exhaust hoods	plating tanks	vessel exteriors

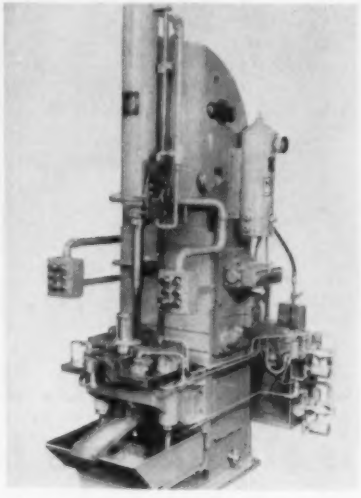
Write for your copy of Bulletin CC-3 giving informative data on the complete Atlas line.

ATLAS MINERAL PRODUCTS COMPANY
MERTZTOWN, PENNSYLVANIA

TECHNICAL REPRESENTATIVES THROUGHOUT THE UNITED STATES

Horning type press

A hydraulic horning type press with continuous automatic cycle, broaches 30 external involute gear teeth on the OD of a bronze automotive synchronizer ring. With the machine running on this cycle, the operator has only to keep a magazine feeding the slide filled with parts. Parts are placed in a tube feed indexed by the spline. The slide picks up a part from the tube and moves it into broaching position. The ram moves the push bar down, pushing the part through the broach pot, broaching the 30 involute gear teeth on the OD. At the end of the broaching stroke, the stripper fingers move in between the part and the broach pot, stripping the part from the push bar which is returned by the ram. A plunger then moves out, ejecting the part down the discharge chute. *American Broach & Machine Co.*



For more data circle No. 52 on postcard, p. 89

Chamfering tools

Twenty sizes and styles of RH and LH 30° and 45° turning and chamfering tools using slug-type indexible inserts in band-type multicut tool holders are announced. The holder design is described as permitting fast and simple insert adjustment and indexing without removing the holder from the machine. By using square inserts eight cutting edges are provided, the maker states, before any insert grinding need is required. *Wesson Co.*

For more data circle No. 53 on postcard, p. 89

TOPS IN TEAM WORK – ALL THREE

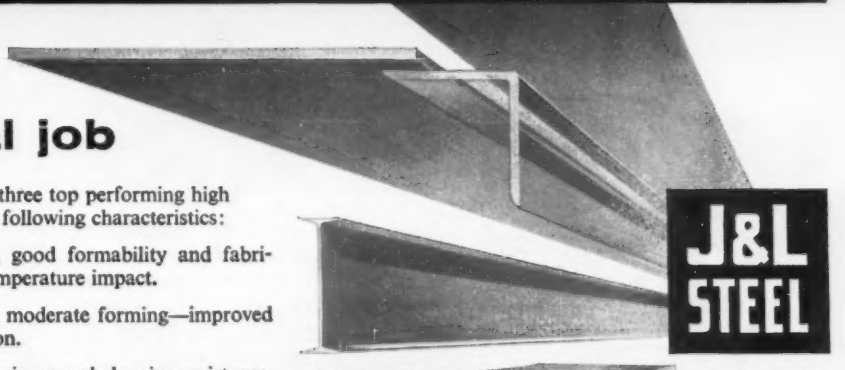
each does a special job

J&L's JALTEN series offers you three top performing high strength, low alloy steels with the following characteristics:

JALTEN NO. 1—High strength, good formability and fabricating—good resistance to low temperature impact.

JALTEN NO. 2—High strength, moderate forming—improved resistance to atmospheric corrosion.

JALTEN NO. 3—High strength—improved abrasion resistance.



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Chemical properties of Jalten
Mechanical properties of Jalten
Jalten equivalents
Jalten application data

Jones & Laughlin Steel Corporation
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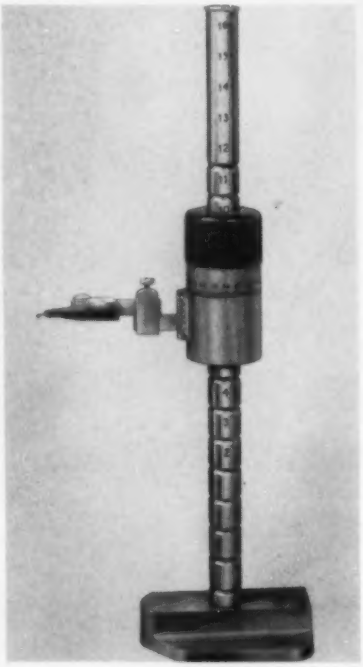
Height gage

Described as an independent, self-contained instrument, the Height Master is available in two models —one reading directly to 0.001 in. is recommended for layout work and general inspection use and the other, reading directly to 0.0005 in. is recommended for checking fixtures, drill jigs and for precision



layout and precision inspection without the use of any reference gages. Unit is described as capable of being set with time-saving speed from inches to hundreds of thousandths in a few seconds. By unloosening a torque screw it can be set to the desired inch and when torque screw is tightened it is locked precisely. *Pacific Gage Co.*

For more data circle No. 54 on postcard, p. 89

3-D magnifier

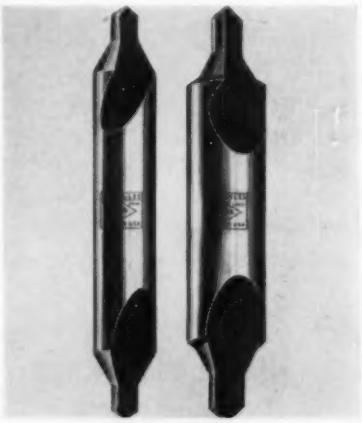
A new 3-D binocular magnifier is used by this young lady to inspect a carbon detector used in a heat treating furnace for carburizing. The magnifier leaves the hands free to work and weighs only 3 oz. Its precision ground prismatic lenses are designed to relieve eye-strain and it gives greatly magnified vision needle sharp in third dimension. Normal vision is resumed by slightly raising head

without removing this Magni-Focuser. *Edroy Products Co.*

For more data circle No. 55 on postcard, p. 89

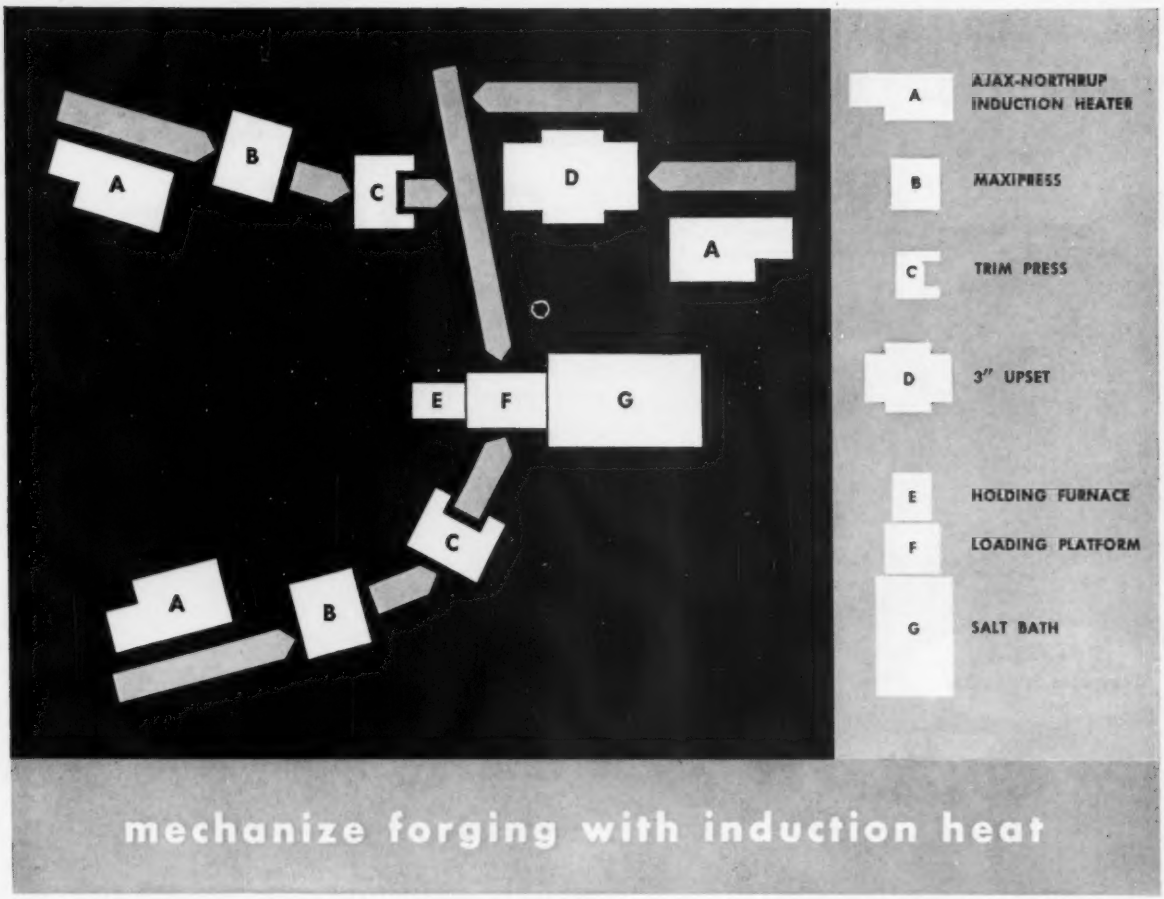
Combined drill-countersink

A combined drill and countersink, featuring spiral flute construction, is designed to provide smoother, more accurate holes and is said to increase production by providing freer cutting chip formation and more efficient chip removal. The unit is available in the plain type in sizes 1 to 8, in high speed or



carbon steel, and in the bell type, sizes 11 to 18 in high speed steel only. By selection of sizes and modification in drill body diameters, the number of sizes has been reduced from 13 to 8, thereby decreasing the number of tools necessary for most centering requirements. Diameters of drill sizes range from 3/64 in. to ¼ in. *Whitman & Barnes.*

For more data circle No. 56 on postcard, p. 89



mechanize forging with induction heat

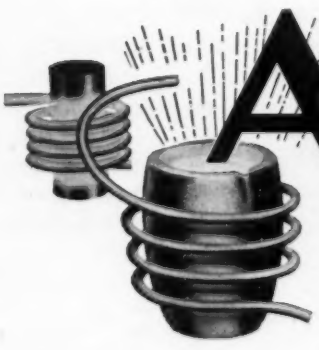
Versatility made Ajax induction heating a natural choice for Massey-Harris' mechanized forge. This one shop handles all the common forging steels, in blanks ranging from one inch rounds to four inch squares, used to make a hundred different automotive and tractor parts. Imaginative forge design, plus the inherent flexibility of Ajax induction heating, make it possible to operate the entire forge with just three induction units . . . each equipped with seven heating fixtures.

The seven fixtures to be used for any given piece can be withdrawn quickly and easily from a "library" adjacent to the forge. Here more than one hundred Ajax-Northrup heating fixtures are completely catalogued and filed in terms of the piece for which they were designed. And the relatively low cost of the fixtures permits Massey-Harris to keep sixty "spares" on hand.

The unusual versatility of this induction heater library is the key to forge mechanization. But Ajax induction heating goes on to pay its way through numerous other advantages. Compared with fuel-fired equipment, for example, induction heating requires less steel, less heating time. There's less scale, dies last longer, rejects are fewer, and working conditions are far better.

Is it any wonder that more forges every day—mechanized or not—are turning to Ajax induction heat? Write Ajax Electrothermic Corporation, Trenton 5, New Jersey, requesting Bulletin 27-B.

Associated Companies: Ajax Electric Company—Ajax Electric Furnace Co.—Ajax Engineering Corp.



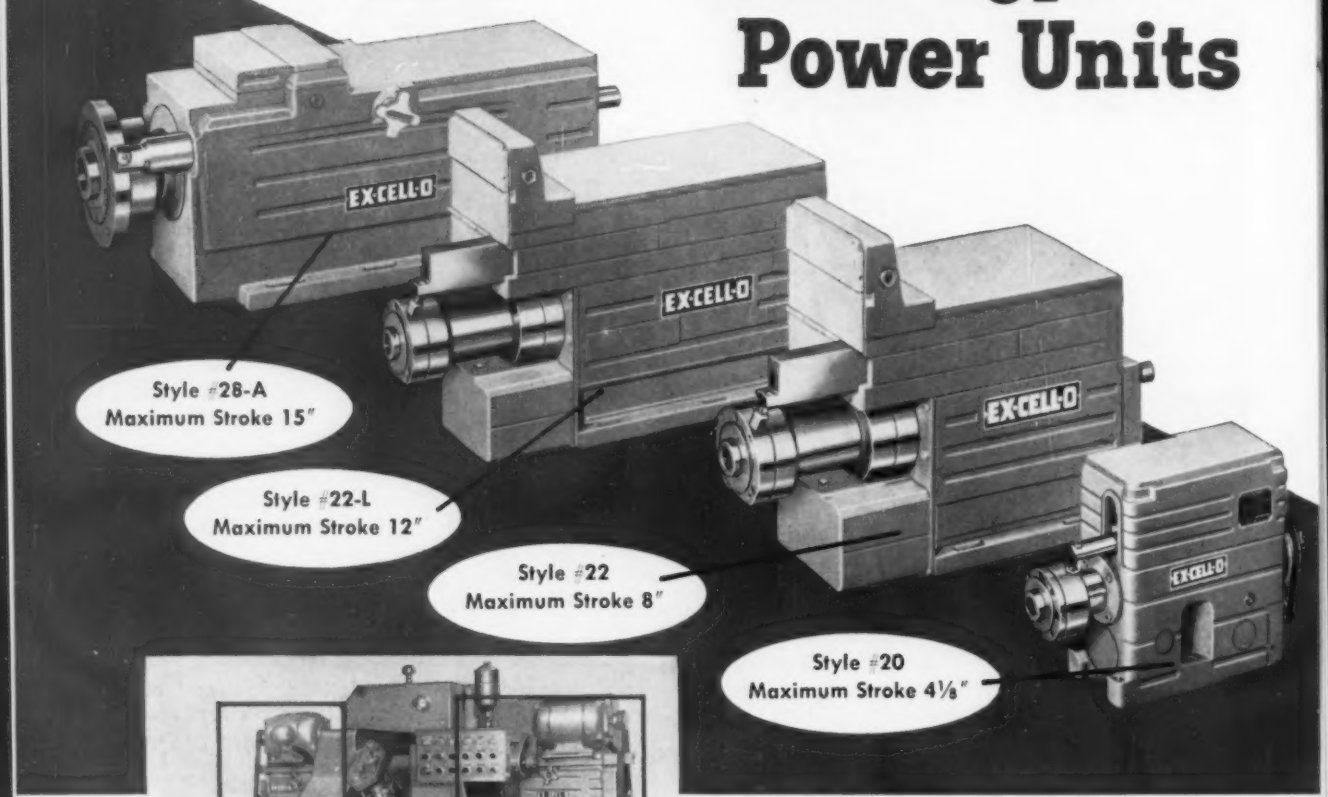
AJAX NORTHRUP SINCE 1916

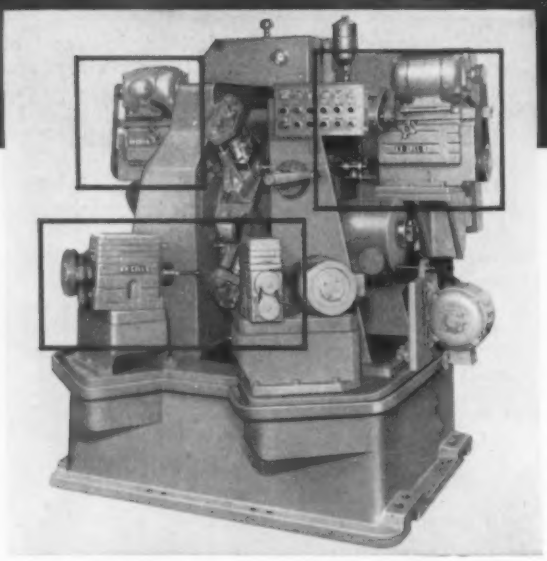
INDUCTION HEATING-MELTING

FOR AUTOMATIC CYCLES IN PRODUCTION MACHINES:

Ex-Cell-O Quill-Type Power Units

XLO
EX-CELL-O for PRECISION





This special machine with automatic indexing fixture core-drills piston pin holes and drills angular oil holes. It uses six Ex-Cell-O Power Units (shown without belt guards) operated from a central push-button station.

Ex-Cell-O Hydraulic Power Units feed and rotate cutting tools in easily controlled automatic cycles. They actuate single tools or multiple spindle heads for such operations as drilling, reaming, counterboring and spot-facing. Hydraulic operation provides smooth, powerful movements.

A machine utilizing Ex-Cell-O Power Units can be very simple, with manual loading and clamping. Or it can be designed with work handling equipment for automation . . .

For complete information, including specifications and installation drawings, ask your Ex-Cell-O Representative or write Ex-Cell-O in Detroit.

EX-CELL-O CORPORATION DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES • CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

55-13

The Iron Age SUMMARY . . .

Shifting steel market puts everybody on the spot . . . Producers are in the middle as consumers scramble for position . . . Automotive sales better . . . Scrap leveling.

Tug of War . . . There's a lot of pulling and hauling going on in the steel market. And the mills are in the middle. They're struggling to cope with changing conditions without putting themselves too far out on a limb.

The situation adds up to this: (1) Everybody knows that steel demand will continue strong for months into the future, but (2) the temporary easing in automotive has clouded the picture just enough to stimulate greater pressure from other industries, which (3) puts the mills in the uncomfortable position of accepting some orders and turning down others.

Some mills are offsetting the slightly easier cold-rolled sheet market by resuming sale of hot-rolled sheets after months of turning down such business. Others are producing light plate on sheet mills to help relieve the impossible plate market.

Automotive Comeback . . . But the producers cannot afford to overdo this sort of thing. One reason is that the auto business is a lot better than the so-called experts expected. Early February sales were good and indications are that heavy dealer stocks were cut by almost one-third. When the figures are in, they may show current stocks of between 450,000 and 500,000 new cars. And Detroit sources say this is not an unusually high number for spring selling season.

Meanwhile, unbalanced inventories have been playing havoc in some industries, particularly construction. For example, a large project halted in mid-December for lack of fabricated structurals finally got underway again last week when the delayed order was filled. More delays of this kind will happen in the months ahead. Shortages of structurals and plate will get no better as the construction season gets into full swing.

Apparently there has been no significant buildup in inventories. The mills keep a running check on steel stocks to avoid being caught by surprise as they have been in the past. But they have uncovered no danger signals to date.

Scrap Situation . . . The scrap market may be nearing a leveling-off stage. Definite signs of strength are showing in some areas. The market is holding firm in most centers. Steel firms, with nearly all available blast furnaces in operation, are privately worried about a possible sharp upturn later, should they not be able to maintain a high blast furnace operating rate to minimize dependence on scrap.

Steel Output, Operating Rates

	This Week	Last Week	Month Ago	Year Ago
Production (Net tons, 000 omitted)	2,449	2,437	2,449	2,171
Ingot Index (1947-1949=100)	152.2	151.4	152.2	135.0
Operating Rates				
Chicago	98.0	98.5	101.5	93.5
Pittsburgh	102.0	104.0*	102.0	91.0
Philadelphia	103.1	105.0*	101.0	84.0
Valley	97.0	92.0*	98.0	90.0
West	100.0	99.0*	97.0	94.0
Detroit	104.0	105.0*	100.0	89.0
Buffalo	105.0	105.0	105.0	100.0
Cleveland	105.0	109.0*	103.0	96.0
Birmingham	95.0	95.0	96.0	86.5
S. Ohio River	96.5	97.0	97.5	72.0
Wheeling	99.0	102.0*	104.0	100.0
St. Louis	106.0	106.0	106.0	96.0
Northeast	87.0	85.0	85.0	87.0
Aggregate	99.5	99.0	99.5	90.0

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.174	5.174	5.174	4.797
Pig Iron (Gross Ton)	$59.09	$59.09	$59.09	$56.59
Scrap, No. 1 hvy (gross ton)	$47.83	$48.67	$50.83	$36.75
Nonferrous				
Aluminum ingot	24.40	24.40	24.40	23.20
Copper, electrolytic	46.00	46.00	43.00	33.00
Lead, St. Louis	15.80	15.80	15.80	14.80
Magnesium	33.25	33.25	33.25	27.75
Nickel, electrolytic	64.50	64.50	64.50	67.67
Tin, Straits, N. Y.	104.75	101.00	102.00	91.125
Zinc, E. St. Louis	13.50	13.50	13.50	11.50

Mills Get Back To HR Sheets

Changing market conditions put new emphasis on hot-rolled sheet business . . . Trend equalizes normal balance in hot-rolled, cold-rolled sheet output . . . Market firm.

◆ SOME MILLS are getting back into the hot-rolled sheet business, reflecting changing conditions in the steel market.

Mills that several months ago decided to limit their output of hot-rolled sheets in favor of the more profitable cold-rolled sheets, now find they have the rolling space available and are out soliciting hot-rolled sheet business.

This doesn't mean, however, that the steel market generally has gone soft. It merely indicates that whereas consumer demand a few months back was top-heavy for cold-rolled sheets, demand today is returning to a more equitable balance.

Some producers are now seeing a few loopholes in their cold-rolled sheet rolling schedules as a result of the general easing in customer demand. This is occasioned in some measure by the current automotive production cutbacks.

One Midwest marginal mill reportedly has had its backlog chopped from 6 mos. to 6 weeks. This is natural, since consumers first cancel premium-price business.

While steel producers probably expect to have their fingers burned somewhat by the falloff in sheet demand from automakers, it's also felt that by May automotive sheet consumption will catch fire again.

It's now believed that auto producers' inventories have been built up to where they want them. And, mills point out that most of their excess sheet output is currently being absorbed by other markets.

SHEETS AND STRIP . . . While some easing in the sheet picture is noted by some producers, (see above), word from **Chicago** indicates that some mills expect automotive sheet demand to step up again 30 to 60 days before anyone thought it would.

Whereas mills there had figured that auto producers would cut back their sheet orders during February and March, and ask for these tonnages in April and May deliveries, some automakers have now requested March delivery on these allotments. In instances where mills have reportedly overbooked on sheet orders for second quarter, this request by auto producers could presage a dangerously-tight sheet situation during May. And, while **Cleveland** mills report some easing in sheet demand from auto producers at the moment, feeling is that this market should show a noticeable pickup again by May, with any excess tonnage in the meanwhile being taken up by other consumers. A report making the rounds in Cleveland is that one auto producer is selling off some cold-rolled sheet inventory in the **Detroit** area, the first time this has happened since 1953. In **Detroit** itself, demand for both sheet and strip is still good. Some companies, including an automotive firm, are said to be having trouble getting enough aluminum-killed sheet. And, on the **West Coast**, mill buyers are stepping up their search in warehouses for flat-rolled stock.

BARS . . . In the **East**, producers' order books for second quarter are well filled for all sizes and types of bars. One producer is working on a month-to-month basis and is now taking carbon bar orders for April. On the **West Coast**, automotive order cutbacks are having little influence on mill bar output. In **Detroit**, the bar situation isn't as critical as it has been. Auto company inventories are generally good, even in the small sizes. Because of some cutbacks in alloy bars, **Cleveland** alloy mill facilities are now being used to turn out carbon bars. In **Chicago**, cold-finished bars are in good supply, though consumers claim hot-rolled bar is as tough to get as plate.

PLATE . . . A scattering of cutbacks in hot-rolled sheet conversion apparently has freed some ingot and mill space for rolling plate in **Chicago**. Consumers are now looking for more ingot for conversion plate, if they can find rolling space in addition to what was already found during the past week. In other major market centers, little letup in plate demand is reported. Major **eastern** producers report demand continues to exceed production capacity and expect this situation to remain unchanged through half the year at least.

STRUCTURALS . . . Like plate, this product continues in heavy demand in virtually every market area. In **Chicago**, light shapes from foreign sources are being used at a rapid rate in lieu of normal domestic deliveries. Mill order books for wide-flange beams and standard structurals are booked solidly into 1957. Indications are that the potentially heavy building backlog is still growing, but structural orders aren't being booked because consumers can't expect delivery of fabricated material before fourth quarter.

WIRE PRODUCTS . . . **Eastern** fabricators report wire rods and manufacturers wire running tight on order demand for the second quarter. Lightest item is merchant wire, expected to show greater strength in the next couple of weeks. Production of welded wire fabric is running at capacity in **Cleveland** and output is expected to remain high for the next 6 mos. despite recent major capacity increases. Manufacturers wire deliveries are out to 6 weeks, with production at capacity. No immediate improvement is thought to be in sight.

WAREHOUSE . . . With the normally big warehouse season approaching, **Chicago** warehousemen are fretting at reports that some mills have again overbooked second quarter capacity in anticipation of automotive cutbacks, which may not prove to be heavy. The only strong inventory item at the Chicago warehouse level is cold-finished bar.

Purchasing Agent's Checklist

DIES: Auto change keeps tool shops busy . . . . . p. 27

TUBES: Prepatterned type finds wide use . . . . . p. 36

TOOLS: Sales spurt keeps backlogs high . . . . . p. 55

INVENTORY: New system called foolproof. . . . . p. 74

Comparison of Prices

(Effective Feb. 28, 1956)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Feb. 28 1956	Feb. 21 1956	Jan. 31 1956	Mar. 1 1955
Flat-Rolled Steel: (per pound)				
Hot-rolled Sheets	4.325¢	4.325¢	4.325¢	4.05¢
Cold-rolled sheets	5.325	5.325	5.325	4.95
Galvanized sheets (10 ga.)	5.85	5.85	5.85	5.45
Hot-rolled strip	4.325	4.325	4.325	4.05
Cold-rolled strip	6.29	6.29	6.29	5.79
Plate	4.52	4.52	4.52	4.225
Plates, wrought iron	10.40	10.40	10.40	9.30
Stainl's C-R strip (No. 302)	44.50	44.50	44.50	42.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) coke	$9.05	$9.05	$9.05	$9.05
Tinplate, electro (0.50 lb.)	7.75	7.75	7.75	7.75
Special coated mfg. ternes	7.85	7.85	7.85	7.85
Bars and Shapes: (per pound)				
Merchant bars	4.65¢	4.65¢	4.65¢	4.30¢
Cold finished bars	5.90	5.90	5.90	5.40
Alloy bars	5.65	5.65	5.65	5.075
Structural shapes	4.60	4.60	4.60	4.25
Stainless bars (No. 302)	38.25	38.25	38.25	35.50
Wrought iron bars	11.50	11.50	11.50	10.40
Wire: (per pound)				
Bright wire	6.25¢	6.25¢	6.25¢	5.75¢
Rails: (per 100 lb.)				
Heavy rails	$4.725	$4.725	$4.725	$4.45
Light rails	5.65	5.65	5.65	5.35
Semifinish Steel: (per net ton)				
Rerolling billets	$68.50	$68.50	$68.50	$64.00
Slabs, rerolling	68.50	68.50	68.50	64.00
Forging billets	84.50	84.50	84.50	78.00
Alloy blooms, billets, slabs	96.00	96.00	96.00	86.00
Wire Rod and Skelp: (per pound)				
Wire rods	5.025¢	5.025¢	5.025¢	4.675¢
Skelp	4.225	4.225	4.225	5.90
Finished Steel Composite: (per pound)				
Base price	5.174¢	5.174¢	5.174¢	4.797¢

	Feb. 28 1956	Feb. 21 1956	Jan. 31 1956	Mar. 1 1955
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$63.69	$63.69	$63.69	$61.19
Foundry, Valley	59.00	59.00	59.00	56.50
Foundry, Southern Cin'ti	62.93	62.93	62.93	60.43
Foundry, Birmingham	55.00	55.00	55.00	52.88
Foundry, Chicago	59.00	59.00	59.00	56.50
Basic, del'd Philadelphia	62.77	62.77	62.77	60.27
Basic, Valley furnace	58.50	58.50	58.50	56.00
Malleable, Chicago	59.00	59.00	59.00	56.50
Malleable, Valley	59.00	59.00	59.00	56.50
Ferromanganese‡, cents per lb.	9.50¢	9.50¢	9.50¢	9.50¢
‡ 74.76 pct Mn base.				
Pig Iron Composite: (per gross ton)				
Pig Iron	$59.09	$59.09	$59.09	$56.59
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	*$47.50*	$49.50	$50.50	$38.50
No. 1 steel, Phila. area	*$9.50*	50.50	52.50	38.25
No. 1 steel, Chicago	46.50	46.00	49.50	33.50
No. 1 bundles, Detroit	44.50	44.50	46.00	29.00
Low phos., Youngstown	53.50	53.50	54.50	36.50
No. 1 mach'y cast, Pittsburgh	55.50	55.50	55.50	43.50
No. 1 mach'y cast, Philadel'a.	54.50	54.50	56.50	43.50
No. 1 mach'y cast, Chicago	50.50	50.50	52.50	45.50
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	*$47.83*	$48.67	$50.83	$36.75
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.25	$14.25	$14.25	$14.88
Foundry coke, prompt	16.25	16.25	16.25	16.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	$46.00	$46.00	$43.00	$33.00
Copper, Lake, Conn.	43.00	43.00	43.00	33.00
Tin, Straits, New York	104.75†	101.00	102.00	91.125
Zinc, East St. Louis	13.50	13.50	13.50	11.50
Lead, St. Louis	15.80	15.80	15.80	14.80
Aluminum, virgin ingot	24.40	24.40	24.40	23.20
Nickel, electrolytic	64.50	64.50	64.50	67.67
Magnesium, ingot	33.25	33.25	33.25	27.75
Antimony, Laredo, Tex.	33.00	33.00	33.00	28.50
† Tentative. ‡ Average. * Revised.				

Finished Steel Composite
Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite
Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite
Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To identify producers, see Key on P. 136→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	60.50	61.00	61.50	62.00	.....
Birdsboro, Pa. *B6*	60.50	61.00	61.50	62.00	.....
Birmingham *R3*	54.50	55.00*	.....	.....	.....
Birmingham *W9*	54.50	55.00*	59.00	.....	.....
Birmingham *U4*	54.50	55.00*	59.00	.....	.....
Buffalo *R3*	58.50	59.00	59.50	60.00	.....
Buffalo *H1*	58.50	59.00	59.50	.....	.....
Buffalo *W6*	58.50	59.00	59.50	60.00	.....
Chester *C17*	60.50	61.00	61.50	.....	.....
Chicago *I4*	58.50	59.00	59.00	59.50	.....
Cleveland *A5*	58.50	59.00	59.00	59.50	63.50
Cleveland *R3*	58.50	59.00	59.00	59.50	.....
Duluth *I4*	58.50	59.00	59.00	59.50	.....
Erie *I4*	58.50	59.00	59.00	59.50	.....
Everett *M6*	.....	62.50	63.00	.....	.....
Fontana *K1*	64.50	65.00	.....	.....	.....
Geneva, Utah *C7*	58.50	59.00	.....	.....	.....
Granite City *G2*	60.40	60.90	61.40	.....	.....
Hubbard *Y1*	.....	.....	59.00	.....	.....
Lone Star *L3*	.....	55.00	.....	.....	.....
Midland *C11*	58.50	.....	.....	.....	.....
Minnequa *C6*	60.50	61.00	61.50	.....	.....
Monessen *P6*	58.50	.....	.....	.....	.....
Neville Is. *P4*	58.50	59.00	59.00	.....	.....
N. Tonawanda *T1*	.....	59.00	59.50	.....	.....
Pittsburgh *U1*	58.50	.....	.....	59.50	.....
Sharpsville *S3*	58.50	59.00	59.00	59.50	.....
So. Chicago *R3*	58.50	.....	59.00	.....	.....
Steelton *B3*	60.50	61.00	61.50	62.00	66.50
Swedeland *A2*	60.50	61.00	61.50	62.00	.....
Toledo *I4*	58.50	59.00	59.00	59.50	.....
Troy, N. Y. *R3*	60.50	61.00	61.50	62.00	66.50
Youngstown *Y1*	.....	.....	59.00	59.50	.....

DIFFERENTIALS: Add, 50¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese or portion thereof over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional, 0.25 pct nickel.
* Add $1.00 for 0.31-0.69 pct phos.

Silvery Iron Buffalo, *H1*, $68.75; Jackson, *J1*, *G1*, $67.50. Add $1.25 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	17.75	19.00	—	20.25	31.50	25.00	33.75	15.00	—	15.25
Slabs, billets, rerolling	22.25	24.75	26.75	26.00	40.25	32.00	43.00	19.50	—	19.75
Forg. discs, die blocks, rings	—	—	—	—	—	—	—	—	—	—
Billets, forging	31.75	32.00	34.75	33.75	51.25	38.25	51.00	25.50	26.00	26.00
Bars, wires, structurals	38.00	38.25	41.00	40.25	60.75	45.25	60.00	30.50	31.00	31.00
Plates	40.00	40.25	42.75	43.00	64.00	49.25	64.75	31.75	32.25	32.25
Sheets	44.25	44.50	52.25	47.25	68.25	54.25	73.50	36.25	—	36.75
Strip, hot-rolled	32.00	34.50	—	37.25	58.25	44.25	59.75	—	—	—
Strip, cold-rolled	41.00	44.50	—	47.25	68.25	54.25	73.50	36.25	—	36.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; McKeesport, Pa., *U1*; Washington, Pa., *W2*, *J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Ft. Wayne, *J4*; Philadelphia, *D5*.

Strip: Midland, Pa., *C11*; Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Middletown, O., *A7*; Harrison, N. J., *D3*; Youngstown, *C5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (.25¢ per lb higher); *W1* (.25¢ per lb higher); New Bedford, Mass., *R6*.

Bar: Baltimore, *A7*; Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*; Ft. Wayne, *I4*; Philadelphia, *D5*; Detroit, *R5*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*.

Plates: Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Philadelphia, *D5*.

Forged discs, die blocks, rings: Pittsburgh, *C11*; Syracuse, *C11*; Ferndale, Mich., *A3*; Washington, Pa., *J2*.

Forgings billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*; Detroit, *R5*.

Steelmaking Price Takes Dip

Latest mill buys in Pittsburgh, Philadelphia drop No. 1 heavy melting price . . . Other steelmaking grades hold firm . . . Market shows slight strength . . . Composite down.

◆ ON THE BASIS of latest mill purchases in Pittsburgh and Philadelphia, No. 1 heavy melting price is off $2 and $1 respectively in these market centers.

A large tonnage of steelmaking scrap went to a major Pittsburgh consumer for $48, while the mill buying price by several Philadelphia consumers was $50. No. 2 grades in both instances held to previous levels.

Meanwhile, in Chicago, a spurt of mill buying failed to bring out heavy tonnages of scrap as dealers continued to boost their offering prices to brokers. No. 2 dealer bundles moved to $36, but attempts to buy factory bundles and No. 1 heavy melting at lower prices met strong resistance.

In other market areas, there were signs that the recent downturn in scrap prices has slowed to a crawl. In some areas, the market is showing signs of renewed strength.

In New York, buoyed by a generally firmer tone, steelmaking prices rose $1. New mill purchases by Valley consumers of No. 1 heavy melting at the top of the quoted price range gave this market a needed shot in the arm.

Reflecting the latest downturn in No. 1 heavy melting price in Pittsburgh and Philadelphia, THE IRON AGE scrap composite price dipped this week to $47.83.

Pittsburgh . . . A large tonnage of steelmaking scrap has been purchased by a major consumer at prices of $48 for No. 1 heavy melting, $44 for No. 2 heavy melting and $41 for No. 2 bundles. This is $2 under previous IRON AGE prices for No. 1 heavy melting with secondary grades remaining at the same levels. Low phos prices are also off $2 a ton.

Chicago . . . A spurt of mill buying last week failed to coax out heavy tonnages of scrap as dealers continued to boost their offering prices to brokers. No. 2 dealer bundles moved at $36, off $1, but attempts to buy factory bundles at reduced prices, as well as No. 1 heavy melting, met strong resistance. With railroad list prices advancing, and with No. 2 heavy melting pegged at $38 by another sale, the market was beginning to move the other way. Cast, electric furnace, and rail grades were showing increasing strength and stiffer pricing. It is being bet that prices will advance in early March despite the strong mill resistance of the past four weeks. Even turnings, until now an extremely weak grade, have shown greater strength, with a small spot sale of shoveling turnings going at $30.

Philadelphia . . . On the basis of latest mill buying, No. 1 heavy melting is off $1. No. 2 steelmaking grades are holding with brokers and dealers reporting relatively little mill interest in these at the moment. Some slight downturns are also reported in several blast furnace grades, off $1, with similar softening showing up in low phos, electric furnace bundles, and heavy turnings. Most other grades are holding to previous quotations.

New York . . . On the basis of a generally firmer tone in market activity in this area, steelmaking prices are up $1 over last week's listings. Export collections have also freshened in recent days. Turnings continue steady, as does cast.

Detroit . . . Prices on the first auto lists to close were down about $1, which is not as much as some expected. There are two reasons the market here is not as soft as it is in other areas of the country. First, the demand is good. Secondly, cutbacks in auto production have drastically reduced scrap available.

Cleveland . . . Valley market picked up strength last week with purchases by 2 mills in the area and 2 on the fringes at the top of the quoted range. Regular No. 1 heavy melting went at $53 and some premium grade to 2 mills at $54. Blast furnace also brought top price of $34 in Cleveland. Tonnage from Detroit auto lists is expected to be down, since local mills there are bidding it up to keep it home, and Northeastern Ohio mills all have comfortable inventory. Foundry grades are slow in coming out and some price increases are expected.

Birmingham . . . A nearby mill was buying No. 2 heavy melting steel this week on a basis of $38 to $39 delivered at the mill and No. 2 bundles on a basis of $28 to $29 delivered at the mill. Brokers' buying prices, however, have been reduced $1 below these prices because of continued weakness in the export market. No. 1 steel, however, still is in demand for electric furnace use and to fill percentage tonnage on export commitments.

St. Louis . . . Several railroad lists brought price advances of $1.50 for No. 1 RR heavy melting, $1 for rail random length and rails 18 in. and under, and $2 for reroller rail. Receipts of scrap dropped an estimated 25 pct in the last two weeks, since prices were reduced, and a readjustment upward may be necessary to stimulate movement for the steel operating rate which jumped to 106 pct.

Cincinnati . . . The market fell into end-of-month doldrums pending announcement of March buying programs. No significant price changes are expected. Increasing interest in local scrap in being shown by a Pittsburgh mill with some barge shipments in March probable.

Buffalo . . . No new orders have been received in the dormant Buffalo market. Dealers say they expect this area's major purchasers to place some orders about the first of March.

Boston . . . Market continues generally quiet. Export traffic is steady but brokers are filling orders from stock in hand. No. 2 steelmaking grades slipped a notch. There was spotty action in blast furnace and cast grades.

West Coast . . . Scrap is flowing freely to mills, who are holding purchases down to immediate needs. Prices are not too firm.

A
SYMBOL
OF
LEADERSHIP
IN
IRON & STEEL
SCRAP
SINCE
1889

Luria Brothers and Company, Inc.

MAIN OFFICE
PHILADELPHIA NATIONAL BANK BLDG.
Philadelphia 7, Penna.

PLANTS
LEBANON, PENNA. DETROIT (ECORSE), MICHIGAN
READING, PENNA. PITTSBURGH, PENNA.
MODENA, PENNA. ERIE, PENNA.

OFFICES
BIRMINGHAM, ALA. HOUSTON, TEXAS PUEBLO, COLORADO
BOSTON, MASS. LEBANON, PENNA. READING, PENNA.
BUFFALO, N. Y. LOS ANGELES, CAL. ST. LOUIS, MO.
CHICAGO, ILLINOIS NEW YORK, N. Y. SAN FRANCISCO, CAL.
CLEVELAND, OHIO PITTSBURGH, PA. SEATTLE, WASH.
DETROIT, MICH. MONTREAL, CANADA

EXPORTS-IMPORTS LIVINGSTON & SOUTHARD, INC. 99 Park Ave., New York, N. Y. *Cable Address:* **FORENTRACO**

Scrap Prices *(Effective Feb. 28, 1956)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$47.00 to $48.00
No. 2 hvy. melting	43.00 to 44.00
No. 1 bundles	47.00 to 48.00
No. 2 bundles	40.00 to 41.00
Machine shop turn	33.00 to 34.00
Mixed bor. and ms. turn	33.00 to 34.00
Shoveling turnings	36.00 to 37.00
Cast iron borings	36.00 to 37.00
Low phos. punch'gs plate	54.00 to 55.00
Heavy turnings	44.00 to 45.00
No. 1 RR hvy. melting	53.00 to 54.00
Scrap rails, random lgth.	62.00 to 63.00
Rails 2 ft and under	67.00 to 68.00
RR. steel wheels	59.00 to 60.00
RR. spring steel	59.00 to 60.00
RR. couplers and knuckles	59.00 to 60.00
No. 1 machinery cast	55.00 to 56.00
Cupola cast	48.00 to 49.00
Heavy breakable cast	45.00 to 46.00

Chicago

No. 1 hvy. melting	$46.00 to $47.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 factory bundles	50.00 to 51.00
No. 1 dealers' bundles	46.00 to 47.00
No. 2 dealers' bundles	35.00 to 36.00
Machine shop turn	26.00 to 27.00
Mixed bor. and turn	28.00 to 29.00
Shoveling turnings	28.00 to 29.00
Cast iron borings	28.00 to 29.00
Low phos. forge crops	55.00 to 57.00
Low phos. punch'gs plate	53.00 to 54.00
Low phos. 3 ft and under	51.00 to 52.00
No. 1 RR. hvy. melting	50.00 to 51.00
Scrap rails, random lgth	59.00 to 60.00
Rerolling rails	66.00 to 67.00
Rails 2 ft and under	64.00 to 65.00
Locomotive tires, cut	55.00 to 56.00
Cut bolsters & side frames	55.00 to 56.00
Angles and splice bars	62.00 to 63.00
RR. steel car axles	62.00 to 63.00
RR. couplers and knuckles	55.00 to 56.00
No. 1 machinery cast	50.00 to 52.00
Cupola cast	47.00 to 48.00
Heavy breakable cast	39.00 to 40.00
Cast iron brake shoes	36.00 to 37.00
Cast iron car wheels	45.00 to 46.00
Malleable	57.00 to 58.00
Stove plate	38.00 to 39.00

Philadelphia Area

No. 1 hvy. melting	$49.00 to $50.00
No. 2 hvy. melting	43.00 to 44.00
No. 1 bundles	49.00 to 50.00
No. 2 bundles	40.00 to 41.00
Machine shop turn	34.00 to 35.00
Mixed bor. short turn	35.00 to 36.00
Cast iron borings	35.50 to 36.50
Shoveling turnings	38.00 to 39.00
Clean cast chem. borings	41.00 to 42.00
Low phos. 5 ft and under	53.00 to 54.00
Low phos. 2 ft and under	55.00 to 56.00
Low phos. punch'gs	55.00 to 56.00
Elec. furnace bundles	52.00 to 53.00
Heavy turnings	45.00 to 46.00
RR. steel wheels	57.00 to 58.00
RR. spring steel	57.00 to 58.00
Rails 18 in. and under	65.00 to 66.00
Cupola cast	48.00 to 50.00
Heavy breakable cast	51.00 to 52.00
Cast iron car wheels	58.00 to 59.00
Malleable	66.50 to 67.50
Unstripped motor blocks	38.00 to 39.00
No. 1 machinery cast	54.00 to 55.00

Cleveland

No. 1 hvy. melting	$49.00 to $50.00
No. 2 hvy. melting	45.00 to 46.00
No. 1 bundles	49.00 to 50.00
No. 2 bundles	38.00 to 39.00
No. 1 busheling	49.00 to 50.00
Machine shop turn.	29.00 to 30.00
Mixed bor. and turn.	33.00 to 34.00
Shoveling turnings	33.00 to 34.00
Cast iron borings	33.00 to 34.00
Cut struct'r'l & plates, 2 ft & under	55.00 to 56.00
Drop forge flashings	49.00 to 50.00
Low phos. punch'gs, plate	50.00 to 51.00
Foundry steel, 2 ft & under	54.00 to 55.00
No. 1 RR. heavy melting	51.00 to 52.00
Rails 2 ft and under	67.00 to 68.00
Rails 18 in. and under	68.00 to 69.00
Railroad grate bars	40.00 to 41.00
Steel axle turnings	34.00 to 35.00
Railroad cast	55.00 to 56.00
No. 1 machinery cast	54.00 to 55.00
Stove plate	51.00 to 52.00
Malleable	57.00 to 58.00

Youngstown

No. 1 hvy. melting	$52.00 to $53.00
No. 2 hvy. melting	41.00 to 42.00
No. 1 bundles	52.00 to 53.00
No. 2 bundles	40.00 to 41.00
Machine shop turn.	29.00 to 30.00
Shoveling turnings	33.00 to 34.00
Cast iron borings	33.00 to 34.00
Low phos. plate	53.00 to 54.00

Buffalo

No. 1 hvy. melting	$45.00 to $46.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 busheling	45.00 to 46.00
No. 1 bundles	45.00 to 46.00
No. 2 bundles	35.00 to 36.00
Machine shop turn.	27.00 to 28.00
Mixed bor. and turn.	28.00 to 29.00
Shoveling turnings	29.00 to 30.00
Cast iron borings	29.00 to 30.00
Low phos. plate	54.00 to 55.00
Scrap rails, random lgth.	51.00 to 52.00
Rails 2 ft and under	65.00 to 66.00
RR. steel wheels	55.00 to 56.00
RR. spring steel	55.00 to 56.00
RR. couplers and knuckles	55.00 to 56.00
No. 1 machinery cast	52.00 to 53.00
No. 1 cupola cast	48.00 to 49.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$44.00 to $45.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 bundles, openhearth	44.00 to 45.00
No. 2 bundles	32.00 to 33.00
New busheling	44.00 to 45.00
Drop forge flashings	43.50 to 44.50
Machine shop turn.	20.00 to 21.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	23.00 to 24.00
Low phos. punch'gs, plate	45.00 to 46.00
No. 1 cupola cast.	44.00 to 45.00
Heavy breakable cast	37.00 to 38.00
Stove plate	38.00 to 39.00
Automotive cast.	48.00 to 49.00

St. Louis

No. 1 hvy. melting	$40.50 to $41.50
No. 2 hvy. melting	37.50 to 38.00
No. 1 bundles	40.50 to 41.50
No. 2 bundles	32.00 to 33.00
Machine shop turn.	26.00 to 27.00
Cast iron borings	28.00 to 29.00
Shoveling turnings	28.00 to 29.00
No. 1 RR. hvy. melting	48.50 to 49.50
Rails, random lengths	56.00 to 57.00
Rails 18 in. and under	63.00 to 64.00
Locomotive tires uncut	53.00 to 54.00
Angles and splice bars	53.00 to 54.00
Std. steel car axles	58.00 to 59.00
RR. specialties	54.00 to 55.00
Cupola cast	47.00 to 48.00
Heavy breakable cast.	37.00 to 38.00
Cast iron brake shoes	37.00 to 38.00
Stove plate	38.00 to 39.00
Cast iron car wheels	44.00 to 45.00
Rerolling rails	65.00 to 66.00
Malleable	50.00 to 51.00
Unstripped motor blocks	37.00 to 38.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$39.00 to $40.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 bundles	39.00 to 40.00
No. 2 bundles	30.00 to 31.00
No. 1 busheling	39.00 to 40.00
Elec. furnace, 3 ft & under	42.00 to 43.00
Machine shop turn.	24.50 to 25.50
Mixed bor. and short turn.	27.00 to 28.00
Shoveling turnings	28.00 to 29.00
Clean cast chem. borings	29.00 to 30.00
No. 1 machinery cast.	43.50 to 44.50
Mixed cupola cast.	39.00 to 40.00
Heavy breakable cast.	41.00 to 42.00
Stove plate	37.00 to 38.00
Unstripped motor blocks	22.00 to 23.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$43.00 to $44.00
No. 2 hvy. melting	38.00 to 39.00
No. 2 bundles	31.00 to 32.00
Machine shop turn.	23.00 to 24.00
Mixed bor. and turn.	23.00 to 24.00
Shoveling turnings	26.00 to 27.00
Clean cast chem. borings	32.00 to 33.00
No. 1 machinery cast	49.00 to 50.00
Mixed yard cast	46.00 to 47.00
Charging box cast	46.00 to 47.00
Heavy breakable cast	46.00 to 47.00
Unstripped motor blocks	31.00 to 32.00

Birmingham

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 bundles	41.00 to 42.00
No. 2 bundles	28.00 to 29.00
No. 1 busheling	41.00 to 42.00
Machine shop turn.	29.00 to 30.00
Shoveling turnings	30.00 to 31.00
Cast iron borings	20.50 to 21.50
Electric furnace bundles	44.00 to 45.00
Bar crops and plate	51.00 to 52.00
Structural and plate, 2 ft	50.00 to 51.00
No. 1 RR. hvy. melting	47.00 to 48.00
Scrap rails, random lgth.	58.00 to 59.00
Rails, 18 in. and under	61.00 to 62.00
Angles & splice bars	57.00 to 58.00
Rerolling rails	61.00 to 62.00
No. 1 cupola cast.	47.50 to 48.50
Stove plate	46.00 to 47.00
Charging box cast.	32.00 to 33.00
Cast iron car wheels	37.00 to 38.00
Unstripped motor blocks	37.00 to 38.00
Mashed tin cans	15.00 to 16.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$45.00 to $46.00
No. 2 hvy. melting	36.00 to 38.00
No. 1 bundles	45.00 to 46.00
No. 2 bundles	34.00 to 36.00
Machine shop turn.	29.00 to 30.00
Mixed bor. and turn.	30.00 to 31.00
Shoveling turnings	31.00 to 32.00
Cast iron borings	30.00 to 31.00
Low phos. 18 in. & under	53.00 to 54.00
Rails, random lengths	58.00 to 59.00
Rails, 18 in. and under	65.00 to 66.00
No. 1 cupola cast.	45.00 to 46.00
Hvy. breakable cast.	42.00 to 43.00
Drop broken cast.	54.00 to 55.00

San Francisco

No. 1 hvy. melting	$40.00
No. 2 hvy. melting	35.00
No. 1 bundles	39.00
No. 2 bundles	32.00
No. 3 bundles	25.00
Machine shop turn.	18.00
Cast iron borings	20.00
No. 1 RR. hvy. melting	40.00
No. 1 cupola cast.	42.00

Los Angeles

No. 1 hvy. melting	$42.00
No. 2 hvy. melting	36.00
No. 1 bundles	39.00
No. 2 bundles	32.00
No. 3 bundles	25.00
Machine shop turn.	18.00
Shoveling turnings	21.00
Cast iron borings	18.00
Elec. furn. 1 ft and under	42.00
No. 1 RR. hvy. melting	42.00
No. 1 cupola cast.	42.00

Seattle

No. 1 hvy. melting	$42.00
No. 2 hvy. melting	38.00
No. 2 bundles	32.00
No. 3 bundles	25.00
No. 1 cupola cast.	45.00
Mixed yard cast.	45.00

Hamilton, Ont.

No. 1 hvy. melting	$45.50
No. 2 hvy. melting	41.50
No. 1 bundles	45.50
No. 2 bundles	38.00
Mixed steel scrap	39.50
Bushelings	35.50
Bush., new fact., prep'd	43.50
Bush., new fact., unprep'd.	39.50
Machine shop turn.	18.00
Short steel turn.	27.50
Mixed bor. and turn.	$16.00 to 19.00
Rails, rerolling	53.50
Cast scrap	42.00 to 45.00

To the memory of Peter the Great

In the year 1770, a great block of solid stone weighing 1500 tons was moved into St. Petersburg as a base for the famous equestrian statue of Peter the Great. Moving of such a huge monolith would have been impossible except for a track with ball bearings, designed under the supervision of a Greek engineer.

Twentieth Century transportation and production could not exist without bearings—bearings of every size, shape and description—another of the thousands of steel requirements. To satisfy the continuous demand for steel in millions of tons, a never-ending supply of scrap must be made available to the mills.

For the purchase or sale of iron or steel scrap...

phone or write "Your Chicago Broker"

M.S. KAPLAN COMPANY

231 S. La Salle St., Chicago

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Copper Prices Hold Spotlight

Almost all copper sellers boost prices . . . Copper & Brass Research Assn. predicts 15.7 pct capacity increase by 1958 . . . Tin Agreement, belling the cat.

◆ PRICES still hold the spotlight in copper markets. Last week major electrolytic producers boosted their price from 43¢ to 46¢ per lb. The box score for this week:

Major Lake copper producer raised its price to 46¢ per lb. This is more of a paper boost since for the last several months all of its production has been going to subsidiaries. Other Lake copper producers are reported to have quietly charged 46¢ for their copper even before electro producers went up.

Custom smelter copper eased up to 53¢ per lb, the highest price since before the turn of the century. The quiet manner in which the boost was handled indicates that the custom smelters are probably taking soundings. If copper stays tight and demand up, the new price will stick. If not, it will drop back 1¢ or so.

Price on the London Metals Exchange, biggest U. S. competitor for pivotal Chilean copper, reacted as had been expected, only more so. Price went up to an all time high, equivalent to 52.50¢ per lb for cash or spot copper. There is little doubt but that this price won't hold too long. It should level off at between 50¢ and 51¢.

Although activity was light, custom smelter buying price for No. 2 copper scrap rose to 43.50¢ per lb. Market serenity was apparently caused by lack of scrap because of the numerous transactions at the previous price of 43¢. There were some indications that a few dealers were holding off on the possibility of another price increase.

Rhodesian Selection Trust Group, controlling a large share of substantial African production, and the Union Miniere du Haut Katanga (Belgian copper) also boosted prices.

On the problem of supply and demand, considered by many to be of greater importance than price, a long range silver lining was supplied by the Copper and Brass Research Assn. This study group is predicting an increase in free world capacity of 15.7 pct by 1958. This would amount to potential output of about 3,386,600 tons as compared to 2,928,000 capacity estimated for 1955.

As with other predictions, the effectiveness of such increased capacity depends on quiet labor situation. While 1955 capacity was close to 3 million tons, only 2.78 million were actually produced because of long and crippling strikes.

Herbert Barchoff, president of the Copper & Brass Warehouse Assn., is not at all happy about the current and immediate future outlook for copper. He lays a good part of the responsibility for the recent producers' price increase at the doorstep of the ODM for refusing to release to industry 100,000 tons of stockpiled Chilean copper last fall.

TIN . . . The story of the organization created by the International Tin Agreement is beginning to resemble the old fable of the mouse trying to bell the cat.

The agreement went into operation on Feb. 1 when the final required ratification came from Indonesia. The document calls for the establishment of a buffer stock of tin to be handled by a manager. When the world price stays within the boundaries of what is called the neutral range (a fair price), nothing will be done. When the price rises too far out of line because of a shortage, tin from the buffer stock will be sold to alleviate the shortage and keep the price down. When the price sinks because of oversupply, the manager is empowered to buy surplus tin for the buffer stock in order to balance supply-and-demand and keep the price up.

The big hitch is getting the buffer stock started. The current market price is in excess of the amount that would be paid by the buffer stock manager. Since tin is subject to considerable fluctuation and these are good times, it seems doubtful that any of the major producers are eager to forgo the profits they feel are necessary to carry them over the lean years that are bound to come. The biggest hope is that the tin price will sink lower and surplus tin will appear on the market before any shortages. Then the stock could be started and the program could have reasonable chance of success. Advocates of this policy point to impending easing of stockpile buying as the best reasoning. However, it may come too little and too late. The government usually slacks off metals procurement very gradually and no doubt is in the process now. But the tin price is staying firm with a recent leaning up the scale because of a threatened strike in Malaya.

ALUMINUM . . . In the annual report for 1955, Reynolds Metals president Richard S. Reynolds, Jr., indicates another top-notch business year for aluminum. In calling 1956 "another year of progress and growth" he sounds a cautious note in recognizing availability as a limiting factor.

Mr. Reynolds' optimism is based on the fact that his company made record profits in 1955, $34,306,521 on all-time record net sales of $384,887,790.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Feb. 22	Feb. 23	Feb. 24	Feb. 25	Feb. 27	Feb. 28
Copper, electro, Conn.	....	46.00	46.00	....	46.00	46.00
Copper, Lake, delivered	....	46.00	46.00	....	46.00	46.00
Tin, Straits, New York	....	102.75	105.375	....	104.875	104.75*
Zinc, East St. Louis	....	13.50	13.50	13.50	13.50	13.50
Lead, St. Louis	....	15.80	15.80	15.80	15.80	15.80

Note: Quotations are going prices. **Tentative*

CLEVELAND *Top Quality* FASTENERS

. . . products that have the high-standard qualities you look for

Responsible manufacturers appreciate the *economy* of using the *best* in their assemblies—including fasteners.

Cleveland Quality starts with steel selection—making sure of approved analysis. Then Cleveland production control insists upon accurate forming to close tolerances; clean threads—accurately concentric, with uniform lead on threads; and machine-cut points. On hex head screws it's important that heads have sharp corners on the sides and a good washer face under the head. Heat treating must be *right*, where it applies; and good appearance in general is desirable—to help dress the finished assembly.

All these factors are carefully checked at Cleveland, where *extra strength* is added, too, through application of the Kaufman *Double Extrusion* Process . . . Notice the wide range of sizes in the list below. Specify Cleveland Fasteners at your jobbers, or write us for catalog.

Ferrous and Non-Ferrous: Bright, High Carbon and Alloy Steel Heat Treated, Brass, Silicon Bronze, Stainless Steel

Hex Head Cap Screws—¼″ to 2½″ dia.
Socket Head Cap and Set Screws—Plain and Knurled: ¼″ to 1½″ dia. Also Flat and Button Head Styles
Flat Head Cap Screws—¼″ to 1″ dia.
Fillister Head—¼″ to 1″ dia.
Set Screws—Square Head—¼″ to 1½″ dia.
Milled Studs—¼″ to 1½″ dia.
Place Bolts—¼″ to 1¼″ dia.
Structural Bolts to ASTM Specification A325
Tractor Bolts
Special Hot and Cold Headed Parts

Facilities to make larger diameters than listed

The Cleveland Cap Screw Company

2917 East 79th Street • Cleveland 4, Ohio • VUlcan 3-3700 TWX CV42

Warehouses: Chicago • Philadelphia • New York • Providence • Los Angeles

Originators of the Kaufman DOUBLE EXTRUSION Process

Nonferrous Prices *(Effective Feb. 28, 1956)*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.136–.249	.250–S.
1100, 3003	40.8	38.7	37.8	36.8
5052	48.3	43.4	41.7	39.9
6061–0	45.4	41.2	39.4	39.8

Extruded Solid Shapes

Factor	6063 T-5	6063 T-6
6– 8	41.6–43.2	56.6–60.2
12–14	42.2–43.7	57.5–61.2
24–26	45.3–45.7	67.7–72.1
36–38	53.6–54.2	90.5–94.3

Screw Machine Stock—2011-T-3

Size*	¼	⅝–⅝	⅞–1	1¼–1¾
Price	54.5	53.4	52.1	50.1

Roofing Sheet, Corrugated

(Per sheet, 26" wide, base, 16,000 lb)

Length* →	72	96	120	144
.019 gage	$1.295	$1.727	$2.160	$2.590
.024 gage	1.615	2.162	2.692	3.233

Magnesium

(f.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type ↓ Gage →	.250–.253	.350–.352	.125	.064	.032
AZ31A Stand. Grade	.....	61	63.5	78	99
AZ31A Spec.	.....	79	83	100	145
Tread Plate	64	.....	68	.....	.....
Tooling Plate	65	.....	.....	.....	.....

Extruded Shapes

	1" diam. rod	shapes lb/ft 0.3	1.0	4.0	2" OD x ⅛" W. tubing
Comm. Grade (FS)	61.50	65.4–73.4	61.9–67.3	57.7–63.2	74.5
Spec. Grade (AZ31B)	73	76.9–83.9	73.4–78.8	69.2–73.7	86

Alloy Ingot

AZ91B (Die Casting) ..... 31 (delivered)
AX63A, AZ92A, AZ91C (Sand Casting) 36 (Velasco, Tex.)

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	102	83	99
Strip, CR	102	93	135
Rod, Bar, HR	87	74	93
Angles, HR	87	74	93
Plate, HR	97	87	95
Seamless Tube	122	110	153
Shot, Blocks	...	71	...

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	63.13	....	63.48
Copper, h-r	58.76	59.11	....
Copper, drawn	....	60.36	....
Low brass	60.15	60.09	....
Yellow brass	55.60	55.54	....
Red brass	61.79	61.73	....
Naval brass	52.83	51.41	48.40
Leaded brass	....	....	48.42
Com. bronze	63.98	63.92	....
Mang. bronze	59.39	53.38	54.94
Phos. bronze	85.37	81.50	....
Muntz metal	53.74	49.55	50.80
Ni silver 10 pct	66.00	68.33	70.68

Beryllium copper Cr, 1.9% Be, Base 1000 lb, f.o.b.
Strip $1.84
Rod, bar, wire 1.81

Titanium

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $13.10-$18.60; alloy $15.25-$15.75; Plate, HR, commercially pure, $10.50-$11.00; alloy, $11.50-$12.00. Wire, rolled and/or drawn, commercially pure, $9.50-$11.50; alloy, $11.50; Bar, HR or forged, commercially pure, $7.90-$8.15; alloy, $7.90-$8.10.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb. freight allowed 24.40
Aluminum pig 22.50
Antimony, American, Laredo, Tex. 33.50
Beryllium copper, per lb conta'd Be $43.00
Beryllium aluminum 5% Be, Dollars per lb contained Be $72.75
Bismuth, ton lots $2.25
Cadmium, del'd $1.70
Cobalt, 97-99% (per lb) ..... $2.60 to $2.67
Copper, electro, Conn. Valley 46.00
Copper, Lake, delivered 46.00
Gold, U. S. Treas., per troy oz. $35.00
Indium, 99.9%, dollars per troy oz. $2.25
Iridium, dollars per troy oz. $100 to $120
Lead, St. Louis 15.80
Lead, New York 16.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb, pig 32.50
ingot 33.25
Magnesium, sticks, 100 to 500 lb. 53.00
Mercury dollars per 76-lb flask, f.o.b. New York ..... $268 to $272
Nickel electro 64.50
Nickel oxide sinter at Copper Cliff, Ont., contained nickel 60.75
Palladium, dollars per troy oz. $23 to $24
Platinum, dollars per troy oz. $97 to $107
Silver, New York, cents per troy oz. 90.75
Tin, New York 104.75*
Titanium sponge, grade A-1 $3.15 to $3.45
Zinc, East St. Louis 13.50
Zinc, New York 14.00
Zirconium, sponge $10.00
* Tentative

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot
No. 115 ..... 44.00
No. 120 ..... 43.00
No. 123 ..... 42.00
80-10-10 ingot
No. 305 ..... 47.75
No. 315 ..... 46.00
88-10-2 ingot
No. 210 ..... 60.75
No. 215 ..... 56.75
No. 245 ..... 50.75
Yellow ingot
No. 405 ..... 34.75
Manganese bronze
No. 421 ..... 39.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 31.00-31.50
0.60 copper max. 30.75-31.25
Piston alloys (No. 122 type) 32.50-33.25
No. 12 alum. (No. 2 grade) 29.50-30.00
108 alloy 29.50-30.00
195 alloy 31.00-32.00
13 alloy (0.60 copper max.) 30.75-31.25
AX8-679 ..... 29.50-30.00

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½% 29.50-30.50
Grade 2—92-95% 28.50-29.50
Grade 3—90-92% 28.00-29.00
Grade 4—85-90% 27.50-28.25

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	42	41¼
Yellow brass	31¼	29
Red brass	37	36¼
Comm. bronze	38½	37¾
Mang. bronze	29¼	28½
Yellow brass rod ends	31¼	....

Custom Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 45
No. 2 copper wire 43½
Light copper 41
*Refinery brass 39½
* Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire 45
No. 2 copper wire 43½
Light copper 44 1/10
No. 1 composition 35½
No. 1 comp. turnings 35
Hvy. yellow brass solids 26
Brass pipe 28½
Radiators 28

Aluminum

Mixed old cast ..... 19½—20½
Mixed new clips ..... 20½—21½
Mixed turnings, dry ..... 20 —21

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire. 41 —42
No. 2 heavy copper and wire. 39 —40
Light copper ..... 37 —38
New type shell cuttings 36½
Auto radiators (unsweated) 24½—25
No. 1 composition ..... 32 —32½
No. 1 composition turnings 30 —30½
Unlined red car boxes ..... 25 —25½
Cocks and faucets ..... 25 —26
Clean heavy yellow brass ..... 21 —21½
Brass pipe ..... 26 —27
New soft brass clippings ..... 27 —27½
No. 1 brass rod turnings ..... 24½—25

Aluminum

Alum. pistons and struts ..... 17 —17½
Aluminum crankcases ..... 16¾—17¼
1100 (2S) aluminum clippings 19½—20
Old sheet and utensils ..... 16¾—17¼
Borings and turnings ..... 11½—12
Industrial castings ..... 16¾—17¼
2024 (24S) clippings ..... 19 —19½

Zinc

New zinc clippings ..... 8½— 9
Old zinc ..... 6 — 6½
Zinc routings 4¼
Old die cast scrap 3½

Nickel and Monel

Pure nickel clippings $1.50
Clean nickel turnings $1.25
Nickel anodes $1.50
Nickel rod ends $1.50
New Monel clippings 60
Clean Monel turnings 50
Old sheet Monel 55
Nickel silver clippings, mixed. 25
Nickel silver turnings, mixed. 21

Lead

Soft scrap lead ..... 12½—13
Battery plates (dry) ..... 7 — 7¼
Batteries, acid free 4½

Miscellaneous

Block tin ..... 84 —85
No. 1 pewter ..... 66 —67
Auto babbitt ..... 43½—44½
Mixed common babbitt 15½
Solder joints ..... 20 —20½
Siphon tops 50
Small foundry type ..... 16¼—16½
Monotype ..... 15½—16
Lino. and stereotype ..... 14½—15
Electrotype ..... 13 —13½
Hand picked type shells ..... 10½—11
Lino. and stereo. dross ..... 5¾— 6
Electro. dross ..... 4¾— 5

IRON AGE

STEEL PRICES

(Effective Feb. 28, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$96.00 *B3*		4.65 *B3*	6.80 *B3*	4.65 *B3*						
	Buffalo, N. Y.	$68.50 *B3*	$84.50 *R3, B3*	$96.00 *R3, B3*	5.45 *B3*	4.65 *B3*	6.80 *B3*	4.65 *B3*	4.325 *R3,B3*	6.25 *B3* 6.25 *R7,S10*	6.425 *B3*	9.10 *B3*		
	Claymont, Del.													
	Harrison, N. J.													13.45 *C11*
	Conshohocken, Pa.								4.375 *A2*	6.30 *A2*	6.425 *A2*			
	New Bedford, Mass.									6.70 *R6*				
	Johnstown, Pa.	$68.50 *B3*	$84.50 *B3*	$96.00 *B3*		4.65 *B3*	6.80 *B3*							
	Boston, Mass.									6.80 *T8*				13.80 *T8*
	New Haven, Conn.									6.70 *D1* *A5*				
	Phoenixville, Pa.					5.15 *P2*		5.15 *P2*						
	Sparrows Pt., Md.								4.325 *B3*	6.25 *B3*	6.425 *B3*	9.10 *B3*		
	Bridgeport, Wallingford, Conn.	$73.50 *N8*	$89.50 *N8*						4.625 *N8*	6.70 *W1*			7.50 *N8*	
	Pawtucket, R. I. Worcester, Mass.									6.80 *N7* *A5*				*A5* 13.80 *N7*
MIDDLE WEST	Alton, Ill.								4.50 *L1*					
	Ashland, Ky.								4.325 *A7*					
	Canton-Massillon, Dover, Ohio		$86.50 *R3*	$96.00 *R3*										13.45 *G4*
	Chicago, Ill.	$68.50 *U1*	$84.50 *R3, U1,W8*	$96.00 *R3, U1,W8*	5.45 *U1*	4.60 *U1, W8*	6.75 *U1, Y1*	4.60 *U1*	4.55 *A1* 4.325 *N4,W8*	6.35 *A1,T8*			7.20 *W8*	13.45 *T8*
	Cleveland, Ohio									6.25 *A5,J3*		9.30 *A5*		13.45 *A5*
	Detroit, Mich.			$96.00 *R5*					4.425 *G3,M2*	6.35 *D1,D2, G3,M2,P11*	6.525 *G3*	9.20 *D2, G3*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$68.50 *U1*	$84.50 *U1*	$96.00 *U1, Y1*	5.45 *I3*	4.60 *U1, I3*	6.75 *U1, I3*		4.325 *I3, U1,Y1*	6.35 *I3* 6.25 *Y1*	6.425 *I3, U1,Y1*	9.30 *Y1*	7.20 *Y1, U1*	
	Sterling, Ill.								4.425 *N4*					
	Indianapolis, Ind.									6.40 *C5*				
	Newport, Ky.												7.20 *N5*	
	Middletown, Ohio									6.45 *A2*				
	Niles, Warren, Ohio Sharon, Pa.	$68.50 *C10*	$84.50 *C10*	$96.00 *C10*					4.325 *S1, R3*	6.25 *S1, R3,T4*	6.425 *S1, R3*	9.10 *S1, R3*	7.20 *S1*	13.45 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$68.50 *U1, J3*	$84.50 *J3, U1,C11*	$96.00 *U1, C11*	5.45 *U1*	4.60 *U1, J3*	6.75 *U1, J3*	4.60 *U1*	4.325 *P6*	6.25 *S7,B4*			7.20 *S9*	13.45 *S9*
	Portsmouth, Ohio								4.325 *P7*					
	Weirton, Wheeling, Follansbee, W. Va.					4.60 *W3*			4.325 *W3*	6.25 *F3,W3*	6.425 *W3*	9.10 *W3*		
	Youngstown, Ohio		$84.50 *C10*	$96.00 *Y1, C10*		4.60 *Y1*	6.75 *Y1*		4.325 *U1, Y1*	6.25 *Y1,C5*	6.425 *U1, Y1*	9.30 *Y1*	7.20 *U1, Y1*	13.45 *C5*
WEST	Fontana, Cal.	$76.00 *K1*	$92.00 *K1*	$115.00 *K1*		5.25 *K1*	7.40 *K1*	5.40 *K1*	5.075 *K1*	8.00 *K1*	7.525 *K1*		8.85 *K1*	
	Geneva, Utah		$84.50 *C7*			4.60 *C7*	6.75 *C7*							
	Kansas City, Mo.					4.70 *S2*	6.85 *S2*				6.675 *S2*		7.45 *S2*	
	Los Angeles, Torrance, Cal.		$94.00 *B2*	$116.00 *B2*		5.30 *C7, B2*	7.45 *B2*		5.075 *C7, B2*	8.30 *C1*			8.40 *B2*	
	Minnequa, Colo.					4.90 *C6*			5.425 *C6*					
	Portland, Ore.					5.35 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$94.00 *B2*			5.25 *B2, P9*	7.40 *B2*		5.075 *B2, C7*					
	Seattle, Wash.		$98.00 *B2*			5.35 *B2*	7.50 *B2*		5.325 *B2*					
SOUTH	Atlanta, Ga.								4.525 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$68.50 *T2*	$84.50 *T2*			5.10 *C16* 4.60 *R3,T2*	6.75 *T2*		4.325 *R3,T2* 4.825 *C16*		6.425 *T2*			
	Houston, Lone Star, Tex.	$74.50 *L3*	$89.50 *S2*	$101.00 *S2*		4.70 *S2*	6.85 *S2*				6.675 *S2*		7.45 *S2*	

IRON AGE

STEEL PRICES

(Effective Feb. 28, 1956)

Italics identify producers listed in key at end of table. Base prices, fo.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized *10* ga.	Enameling *12* ga.	Long Terne *10* ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled *19* ga.		Cokes* *1.25*-lb. base box	Electro* *0.25*-lb. base box	Holloware Enameling *29* ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.325 *B3*	5.325 *B3*				6.375 *B3*	7.875 *B3*			5.375 *W6*	† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	4.375 *A2*	5.375 *A2*				6.425 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										5.375 *B3*			
	Fairless, Pa.	4.375 *U1*	5.375 *U1*				6.425 *U1*	7.925 *U1*				$9.30 *U1*	$8.00 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.325 *B3*	5.325 *B3*	5.85 *B3*			6.375 *B3*	7.875 *B3*	8.60 *B3*		5.475 *B3*	$9.30 *B3*	$8.00 *B3*	
	Worcester, Mass.										5.675 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										5.20 *L1*			
	Ashland, Ky.	4.325 *A7*		5.85 *A7*	5.90 *A7*									
	Canton-Massillon, Dover, Ohio			5.85 *R1, R3*										
	Chicago, Joliet, Ill.	4.55 *A1* 4.325 *W8*					6.375 *U1*				5.025 *N4* 5.375 *A5,R3*			
	Sterling, Ill.										5.375 *N4*			
	Cleveland, Ohio	4.325 *J3, R3*	5.325 *J3, R3*		5.90 *R3*		6.375 *J3, R3*	7.875 *J3, R3*			5.375 *A5*			
	Detroit, Mich.	4.425 *G3, M2*	5.425 *G3* 5.325 *M2*				6.475 *G3*	7.975 *G3*						
	Newport, Ky.	4.325 *N5*	5.325 *N5*	5.85 *N5*										
	Gary, Ind. Harbor, Indiana	4.325 *I3, U1,Y1*	5.325 *I3, U1,Y1*	5.85 *U1, I3*	5.90 *U1, I3*	6.25 *U1*	6.375 *Y1, U1,I3*	7.875 *U1, Y1*			5.025 *Y1*	$9.20 *I3, U1,Y1*	$7.90 *I3, U1,Y1*	6.65 *U1, Y1*
	Granite City, Ill.	4.525 *G2*	5.525 *G2*	6.05 *G2*	6.10 *G2*								$8.00 *G2*	6.75 *G2*
	Kokomo, Ind.			5.95 *C9*							5.475 *C9*			
	Mansfield, Ohio	4.325 *E2*	5.325 *E2*			6.25 *E2*				*E2*				
	Middletown, Ohio		5.325 *A7*	5.85 *A7*	5.90 *A7*	6.25 *A7*								
	Niles, Warren, Ohio Sharon, Pa.	4.325 *S1, R3,N3*	5.325 *R3, N3*	5.85 *R3* 6.85 *N3*	5.90 *N3*	6.25 *N3*	6.375 *S1, R3*	7.875 *R3*				$9.20 *R3*	$7.90 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.325 *J3, U1,P6*	5.325 *J3, U1,P6*	5.85 *U1*	5.90 *U1, A7*		6.375 *J3, U1*	7.875 *U1*	8.60 *U1*		5.025 *P6* 5.375 *A5*	$9.20 *J3, U1*	$7.90 *J3, U1*	6.65 *U1*
	Portsmouth, Ohio	4.325 *P7*	5.325 *P7*								5.375 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.325 *W3, W5*	5.325 *W3, W5,F3*	5.85 *W3, W5*		6.25 *W3, W5*	6.375 *W3*	7.875 *W3*				$9.20 *W3, W5*	$7.90 *W3, W5*	6.65 *F3, W5*
	Youngstown, Ohio	4.325 *U1, Y1*	5.325 *Y1*		5.90 *Y1*		6.375 *U1, Y1*	7.875 *Y1*			5.025 *Y1*			
WEST	Fontana, Cal.	5.075 *K1*	6.425 *K1*				7.125 *K1*	8.975 *K1*						
	Geneva, Utah	4.425 *C7*												
	Kansas City, Mo.										5.625 *S2*			
	Los Angeles, Torrance, Cal.										6.175 *B2*			
	Minnequa, Colo.										5.275 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.025 *C7*	6.275 *C7*	6.60 *C7*							5.675 *C7*	$9.95 *C7*	$8.65 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.325 *R3, T2*	5.325 *T2*	5.85 *R3, T2*			6.375 *T2*			5.625 *R3*	5.025 *R3, T2*	$9.30 *T2*	$8.00 *T2*	
	Houston, Tex.										5.625 *S2*			

IRON AGE

STEEL PRICES

(Effective Feb. 28, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon Merchant	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				5.575 *B3*	7.425 *B3*	6.80 *B3*					
	Buffalo, N. Y.	4.65 *B3,R3*	4.65 *B3,R3*	6.30 *B5*	5.575 *B3,R3*	7.425 *B3,B5*	6.80 *B3*	4.50 *B3,R3*				6.60 *W6*
	Claymont, Del.							4.80 *C4*		6.30 *C4*	6.725 *C4*	
	Coatesville, Pa.							4.80 *L4*		6.30 *L4*	6.725 *L4*	
	Conshohocken, Pa.							4.50 *A2*	5.575 *A2*		6.725 *A2*	
	Harrisburg, Pa.							5.10 *P2*	5.575 *C3*			
	Hartford, Conn.			6.40 *R3*		7.725 *R3*						
	Johnstown, Pa.	4.65 *B3*	4.65 *B3*		5.575 *B3*		6.80 *B3*	4.50 *B3*		6.30 *B3*	6.725 *B3*	6.60 *B3*
	Fairless, Pa.	4.80 *U1*	4.80 *U1*		5.725 *U1*							
	Newark, N. J.			6.70 *W10*		7.60 *W10*						
	Camden, N. J.			6.70 *P10*								
	Bridgeport, Putnam, Conn.	4.80 *N8*		6.80 *W10*	5.725 *N8*			4.750 *N8*				
	Sparrows Pt., Md.		4.65 *B3*					4.50 *B3*		6.30 *B3*	6.725 *B3*	6.70 *B3*
	Palmer, Worcester, Readville, Mass. Milton, Pa.	4.80 *M7*	4.80 *M7*	6.70 *W11* 6.45 *C14* 6.70 *B5*		7.725 *A5,B5*		4.50 *R3*				6.90 *A5* 6.90 *W6*
	Spring City, Pa.			6.35 *K4*		7.60 *K4*						
MIDDLE WEST	Alton, Ill.	4.85 *L1*										6.425 *L1*
	Ashland, Newport, Ky.							4.50 *A7,N5*		6.30 *N5*		
	Canton-Massillon, Mansfield, Ohio	4.75 *R3*		6.25 *R2,R3*	5.575 *R3,T5*	7.425 *R2,R3, T5*		4.50 *E1*				
	Chicago, Joliet, Ill.	4.65 *U1, N4,W8,R3, P13*	4.65 *N4,R3, P13*	6.25 *B5,W8, W10,A5,L2*	5.575 *U1,R3, W8*	7.425 *A5,W8, W10,L2,B5*		4.50 *U1,W8, I3,R3* 4.275 *A1*	5.575 *U1*	6.30 *U1*	6.725 *U1*	6.60 *A5,R3, N4,W7*
	Cleveland, Ohio	4.65 *R3*	4.65 *R3*	6.25 *A5,C13*		7.425 *A5,C13*	6.80 *R3*	4.60 *J3,R3*	5.575 *J3*		6.725 *R3,J3*	6.60 *A5, C13*
	Detroit, Mich.	4.75 *G3*	4.75 *G3*	5.90 *R5* 6.45 *B5* 6.15 *P3* 6.10 *P8*	5.575 *R5* 5.675 *G3*	7.425 *R5* 7.625 *B5,P3, P8*	6.90 *G3*	4.60 *G3*			6.825 *G3*	
	Duluth, Minn.											6.60 *A5*
	Gary, Ind. Harbor, Crawfordsville	4.65 *I3, U1, Y1*	4.65 *I3, U1, Y1*	6.25 *M5,R3*	5.575 *I3, U1, Y1*	7.425 *M5, R3*	6.80 *U1,I3, Y1*	4.50 *I3, U1,Y1*	5.575 *I3*	6.30 *U1,Y1*	6.725 *U1, I3,Y1*	6.35 *M4*
	Granite City, Ill.							4.70 *G2*				
	Kokomo, Ind.											6.70 *C9*
	Sterling, Ill.	4.75 *N4*	4.75 *N4*									6.60 *N4*
	Niles, Warren, Ohio Sharon, Pa.	4.65 *R3,C10*		6.25 *C10*	5.575 *C10*	7.425 *C10*	6.80 *R3*	4.50 *S1,R3*		6.30 *S1*	6.725 *S1*	
	Pittsburgh, Pa. Midland, Pa.	4.65 *J3, U1, C11*	4.65 *J3, U1*	6.25 *A5,C8, C11,J3, W10,B4,R3*	5.575 *U1,C11*	7.425 *A5,C11, W10,C8,R3*	6.80 *J3, U1*	4.50 *J3, U1*	5.575 *U1*	6.30 *U1*	6.725 *J3, U1*	6.60 *A5,J3, P6*
	Portsmouth, Ohio											6.60 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.65 *W3*						4.50 *W3,W5*				
	Youngstown, Ohio	4.65 *U1,Y1, C10,R3*	4.65 *U1,Y1, R3*	6.25 *Y1, U1*	5.575 *U1,Y1, C10*	7.425 *Y1,C10, F2*	6.80 *U1,Y1*	4.50 *U1,Y1, R3*		6.30 *Y1*	6.725 *Y1*	6.25 *Y1*
WEST	Emeryville, Cal.	5.40 *J5*	5.40 *J5*									
	Fontana, Cal.	5.35 *K1*	5.35 *K1*		6.625 *K1*		7.50 *K1*	5.15 *K1*		6.95 *K1*	7.375 *K1*	
	Geneva, Utah							4.50 *C7*			6.725 *C7*	
	Kansas City, Mo.	4.90 *S2*	4.90 *S2*		5.825 *S2*		7.05 *S2*					6.85 *S2*
	Los Angeles, Torrance, Cal.	5.35 *B2,C7*	5.35 *B2,C7*	7.35 *R3*	6.625 *B2*		7.50 *B2*				7.625 *B2*	7.55 *B2*
	Minnequa, Colo.	5.10 *C6*	5.10 *C6*					5.35 *C6*				6.50 *C6*
	Portland, Ore.	5.40 *O2*	5.40 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.35 *C7* 5.40 *B2,P9*	5.35 *C7* 5.40 *B2,P9*				7.55 *B2*					7.20 *C7*
	Seattle, Wash.	5.40 *B2,P12, N6*	5.40 *B2,P12*				7.55 *B2*	5.40 *B2*		7.20 *B2*	7.625 *B2*	
SOUTH	Atlanta, Ga.	4.85 *A8*	4.85 *A8*									6.45 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	4.65 *T2,R3* 5.15 *C16*	4.65 *T2,R3* 5.15 *C16*				6.80 *T2*	4.50 *T2,R3*			6.725 *T2*	6.60 *R3, T2*
	Houston, Ft. Worth, Lone Star, Tex.	4.90 *S2*	4.90 *S2*		5.825 *S2*		7.05 *S2*	4.85 *L3* 4.60 *S2*		6.40 *S2*	6.825 *S2*	6.85 *S2*

Steel Prices *(Effective Feb. 28, 1956)*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.
D5 Henry Disston & Sons, Inc., Philadelphia

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit.
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I5 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P12 Pacific Steel Rolling Mills, Seattle
P13 Phoenix Mfg. Co., Joliet, Ill.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Forth Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½ In.		3 In.		3½-4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75								
Youngstown *R3*	18.50	1.25	21.50	5.25	24.00	8.75	26.50	10.00	27.00	11.00	27.50	11.50	29.00	11.75								
Fontana *K1*	7.00	+2.25	10.00	+8.25	12.50	+4.75	15.00	+3.00	15.50	+2.00	16.00	+1.50	17.50	+0.75								
Pittsburgh *J3*	18.50	1.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Alton, Ill. *L1*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75								
Sharon *M3*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75								
Fairless *N2*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75								
Pittsburgh *N1*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Wheeling *W5*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75								
Wheatland *W4*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75								
Youngstown *Y1*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Indiana Harbor *Y1*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.00	26.00	11.50	26.50	12.00	28.00	11.75								
Lorain *N2*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75								
Youngstown *R3*	23.00	7.25	27.00	11.25	29.00	14.75	29.50	14.00	30.00	15.00	30.50	15.50	31.00	14.75								
Fairless *N2*	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75								
Fontana *K1*	11.50		15.50		17.50		18.00		18.50		19.00		19.50									
Pittsburgh *J3*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Alton, Ill. *L1*	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75								
Sharon *M3*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75								
Pittsburgh *N1*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Wheeling *W5*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75								
Wheatland *W4*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75								
Youngstown *Y1*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Indiana Harbor *Y1*	22.00	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75								
Lorain *N2*	21.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75

Threads only, buttweld and seamless 2¼ pt higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2 in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 11¢ to 13¢ would lower discounts; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.50¢ per lb.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb
18	4	1	—	—	$1.60
18	4	1	—	5	2.305
18	4	2	—	—	1.765
1.5	4	1.5	8	—	.96
6	4	2	6	—	1.35
6	4	2	5	—	1.105

High-carbon chromium ..... .77
Oil hardened manganese ..... .43
Special carbon ..... .39
Extra carbon ..... .33
Regular carbon ..... .275

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*A3, J2, L4*) 10 pct	Plate (*A3, J2, L4*) 15 pct	Plate (*A3, J2, L4*) 20 pct	Sheet (*I2*) 20 pct
Stainless Type	304	30.30	33.15	36.05	32.50
	316	35.50	38.45	41.40	47.60
	321	32.00	34.85	37.75	37.25
	347	34.40	37.90	41.40	48.25
	405	25.80	29.60	33.35	.....
	410, 430	25.30	29.10	32.85	.....

CR Strip (S9) Copper, 10 pct, 2 sides, 33.00; 1 side, 30.00.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	8.40	8.60	.....
Armature	9.35	9.60	10.10
Elect.	9.95	10.20	10.70
Motor	10.95	11.20	11.70
Dynamo	11.85	12.10	12.60
Trans. 72	12.80	13.05	13.55
Trans. 65	13.35	Grain Oriented	
Trans. 58	13.85	Trans. 80	17.45
Trans. 52	14.85	Trans. 73	17.95

Producing points: Beech Bottom (*W5*); Brackenridge (*A5*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E7*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R5*); Zanesville (*A7*).

* Coils 75¢ higher.

LAKE SUPERIOR ORES

51.50% *Fe natural content, delivered lower Lake ports. Prices for* 1956 *season. Freight changes for seller's account.*

	Gross Ton
Openhearth lump	$12.10
Old range, bessemer	11.25
Old range, nonbessemer	11.10
Mesabi, bessemer	11.00
Mesabi, nonbessemer	10.85
High phosphorus	10.85

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Cal	Woven Wire Fence 9–15½ ga. Cal	"T" Fence Posts Cal	Single Loop Bale Ties Galv. Barbed and Twisted Barbless Wire Cal	Merch. Wire Annl'd ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	152	162	173	175	7.40	7.80
Aliquippa, Pa. *J3*	152	162	...	...	7.40	7.80
Atlanta *A8*	154	167	175	180	7.50	8.025
Bartonville *K2**	154	168	175	181	7.50	8.075
Buffalo *W6*	...	...	...	...	7.40	7.80
Chicago, Ill. *N4***	152	166	173	179	7.40	8.00
Cleveland *A6*	157	...	...	...	7.40	.....
Cleveland *A5*	...	...	...	...	7.40	.....
Crawfordsville *M4**	154	167	175	175	7.50	8.05
Donora, Pa. *A5*	152	162	173	175	7.40	7.80
Duluth *A5*	152	162	173	175	7.40	7.80
Fairfield, Ala. *T2*	152	162	173	175	7.40	7.80
Galveston *D4*	157	...	...	...	...	.....
Houston *S2*	157	170	...	180	7.45	8.05
Johnstown, Pa. *B3**	152	166	...	175	7.40	7.80
Joliet, Ill. *A5*	152	162	173	175	7.40	7.80
Kokomo, Ind. *C9*	154	154	175	177	7.50	7.90
Los Angeles *B2**	...	...	...	...	8.35	8.925
Kansas City *S2*	157	167	178	180	7.65	8.05
Minnequa *C6*	157	167	162 178	180	7.65	8.05
Monessen *P6*	152	162	...	...	7.40	7.80
Moline, Ill. *R3*	...	162	162	...	...	.....
Pittsburg, Cal. *C7*	171	185	...	195	8.35	8.75
Portsmouth *P7*	...	...	...	...	7.40	.....
Rankin, Pa. *A5*	152	162	...	175	7.40	7.80
So. Chicago *R3*	152	162	157 173	175	7.40	7.80
S. San Francisco *C6*	...	...	197	195	8.35	8.75
Sparrows Pt. *B3**	154	...	175	181	7.50	8.075
Struthers, O. *Y1*	...	...	...	...	7.40	7.90
Worcester *A5*	158	...	...	...	7.70	.....
Williamsport, Pa. *S5*	...	...	160	...	...	.....

Galvanized products computed with zinc at 5¢ per lb
Exceptions: *zinc at 12.5¢ per lb; **13¢ zinc.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Bristol, Conn. *W12*	...	...	10.80	12.95	15.65
Buffalo, N. Y. *R7*	7.00	8.95	10.50	12.65	15.35
Carnegie, Pa. *S9*	...	9.05	10.60	12.75	15.35
Cleveland *A5*	7.10	9.05	10.60	12.75	15.45
Detroit *D1*	7.20	9.15	10.70	12.85	.....
Detroit *D2*	7.20	9.15	10.70	...	.....
Harrison, N. J. *C11*	...	...	14.80	18.15	22.00
Indianapolis *C5*	7.15	9.10	10.50	12.65	15.35
New Castle, Pa. *B4*	7.00	8.95	10.50	12.65	.....
New Haven, Conn. *D1*	7.55	9.35	10.90	13.05	.....
Pawtucket, R. I. *N7*	7.45	9.35	10.90	13.05	15.75
Pittsburgh *S7*	7.10	9.05	10.60	12.75	15.45
Riverdale, Ill. *A1*	7.20	9.05	10.60	12.75	15.45
Sharon, Pa. *S1*	7.10	9.05	10.60	12.75	15.45
Trenton *R4*	...	...	...	...	.....
Wallingford *W1*	7.45	9.25	10.80	12.95	15.65
Warren, Ohio *T4*	7.00	8.95	10.50	12.65	15.35
Weirton, W. Va. *W3*	7.10	8.95	10.50	...	.....
Worcester, Mass. *A5*	7.65	9.35	10.90	13.05	15.75
Youngstown *C5*	7.00	8.95	10.50	12.65	15.35

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	30.87	36.51	29.93	.....
	2½	12	41.57	49.16	40.31	.....
	3	12	47.99	56.76	46.55	.....
	3½	11	56.03	66.27	54.34	.....
	4	10	74.41	88.00	72.17	.....
National Tube	2	13	30.87	36.51	29.93	.....
	2½	12	42.57	49.16	40.31	.....
	3	12	47.99	56.76	46.55	.....
	3½	11	56.03	66.27	54.34	.....
	4	10	74.41	88.00	72.17	.....
Pittsburgh Steel	2	13	30.87	36.51	.....	.....
	2½	12	41.57	49.16	.....	.....
	3	12	47.99	56.76	.....	.....
	3½	11	56.03	66.27	.....	.....
	4	10	74.41	88.00	.....	.....

WAREHOUSES

Metropolitan Price, dollars per 100 lb.

Cities	↔ City Delivery Charge	Sheets Hot-Rolled	Sheets Cold-Rolled	Sheets Galvanized (10 gage)	Strip Hot-Rolled	Strip Cold-Rolled	Plates	Shapes Standard Structural	Bars Hot-Rolled	Bars Cold-Finished	Alloy Bars Hot-Rolled 4615 As rolled	Alloy Bars Hot-Rolled 4140 Annealed	Alloy Bars Cold-Drawn 4615 As rolled	Alloy Bars Cold-Drawn 4140 Annealed
Baltimore	$.10	7.31	8.32	8.37	7.65	.....	7.63	7.93	7.61	8.62	14.38	13.44–13.96	16.36	16.29–16.49
Birmingham	.15	6.80	7.93	8.85	7.06	.....	6.99	7.28	7.08	9.35	.....	.....	.....	.....
Boston	.10	7.85	8.91	10.37	8.06	.....	7.99	8.23	7.97	9.77	.....	13.60	.....	16.70
Buffalo	.15	7.35	8.40	10.16	7.50	.....	7.80	7.75	7.50	8.25	.....	13.45	.....	16.50
Chicago	.15	7.28	8.29	9.25	7.36	.....	7.60	7.58	7.42	7.90	.....	13.20	.....	16.30
Cincinnati	.15	7.24	8.23	9.10	7.45	.....	7.74	7.90	7.51	8.15	13.59	13.29	16.44	16.39
Cleveland	.15	7.28	8.24	8.95	7.31	.....	7.77	7.76	7.33	8.00	13.41	13.11	16.26	16.21
Denver	.....	8.60	10.76	11.22	8.90	.....	8.60	8.75	8.90	9.82	.....	.....	.....	17.97
Detroit	.15	7.47	8.43	9.53	7.49	.....	7.88	7.90	7.55	.....	13.70	13.40	16.55	16.50
Houston	.....	7.85	8.75	10.49	8.15	.....	7.80	8.20	8.25	9.85–9.95	14.35	14.00	17.15	17.05
Kansas City	.20	7.47	8.76	9.17	7.73	.....	7.66	7.95	7.75	8.52	13.87	13.52	16.72	16.57
Los Angeles	.10	8.60	10.10	11.10	8.45	.....	8.85	8.40	8.25	11.00	.....	14.45	.....	18.00
Memphis	.10	7.12	8.25	.....	7.38	.....	7.31	7.60	7.40	9.15	.....	.....	.....	.....
Milwaukee	.15	7.37	8.48	9.34	7.45	.....	7.69	7.75	7.51	8.09	.....	13.29	.....	16.39
New Orleans	.15	7.20	8.35	.....	7.45	.....	7.40	7.70	7.50	9.55	.....	.....	.....	.....
New York	.10	7.71	8.94	9.69	8.27	.....	7.96	8.19	8.21	9.68	.....	13.53	.....	16.63
Norfolk	.20	7.25	.....	.....	7.65	.....	7.45	7.95	7.65	9.50	.....	.....	.....	.....
Philadelphia	.10	7.42	8.52	9.47	8.03	.....	7.78	7.84	7.78	8.56	.....	13.31	.....	16.41
Pittsburgh	.15	7.28	8.24	9.40	7.31	9.00	7.60	7.43	7.27	8.00	13.35	13.05	16.20	16.15
Portland	.....	7.80–8.60	8.80–10.15	10.65	8.00	7.95	7.75	7.85–8.15	7.95	12.20	.....	15.00	.....	17.50
Salt Lake City	.20	.....	10.60	.....	9.35	.....	.....	9.20	9.15	.....	.....	.....	.....	.....
San Francisco	.10	8.20	9.75	10.25	8.45	.....	8.15	8.35	8.25	11.55	.....	14.45	.....	18.00
Seattle	.00	8.65	10.40	10.80	8.90	.....	8.40	8.40	8.60	.....	.....	14.65	.....	.....
St. Louis	.15	7.57	8.68	9.84	7.65	.....	7.89	7.98	7.71	8.44	.....	13.49	.....	16.59
St. Paul	.25	7.94	8.59–9.14	9.89	7.72	.....	7.65	7.94	7.74	8.51	.....	13.51	.....	16.31

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

Exceptions: (1) 1500 to 9999 lb. (2) 1000 lb or over. (3) $.25 delivery. (4) 1000 to 1999 lb, $.25 delivery.

*Plus analysis charge. ‡Deduct for country delivery.

(Effective Feb. 28, 1956)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer *UI*	4.725	5.65	5.825				
So. Chicago *R3*				7.90			
Ensley *T2*	4.725	5.65					
Fairfield *T2*		5.65		7.90		5.625	
Gary *UI*	4.725	5.65				5.625	
Ind. Harbor *I3*	4.725		5.825	7.90		5.625	
Ind. Harbor *YI*				7.90			
Johnstown *B3*		5.65					
Joliet *UI*		5.65	5.825				
Kansas City *S2*				7.90			
Lackawanna *B3*	4.725	5.65	5.825			5.625	
Lebanon *B3*							12.15
Minnequa *C6*	4.725	6.15	5.825	7.90		5.625	12.15
Pittsburgh *OI*					11.90		12.15
Pittsburgh *P5*							12.15
Pittsburgh *J3*				7.90			
Seattle *B2*				8.40		5.775	12.65
Steelton *B3*	4.725		5.825			5.625	
Struthers *YI*				7.90			
Torrance *C7*						5.775	
Williamsport *S5*		5.65					
Youngstown *R3*				7.90			

COKE

Furnace, beehive (f.o.b. oven) Connellsville, Pa.	Net-Ton $14.00 to $14.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$16.00 to $16.50
Foundry, oven coke	
Buffalo, del'd	$28.75
Chicago, f.o.b.	27.00
Detroit, f.o.b.	27.50
New England, del'd	28.55
Seaboard, N. J., f.o.b.	26.75
Philadelphia, f.o.b.	26.50
Swedeland, Pa., f.o.b.	26.50
Painesville, Ohio, f.o.b.	27.50
Erie, Pa., f.o.b.	27.50
Cleveland, del'd	29.43
Cincinnati, del'd	28.59
St. Paul, f.o.b.	26.50
St. Louis, f.o.b.	28.50
Birmingham, f.o.b.	25.65
Lone Star, Tex., f.o.b.	19.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	23.00	40	100,110	9.90
20	72	22.25	35	110	9.90
16 to 18	72	22.50	30	110	10.05
14	72	23.00	24	72 to 84	10.30
12	72	23.50	20	90	10.10
10	60	24.25	17	72	10.35
7	60	24.50	14	72	10.85
5	60	27.25	12	60	11.75
4	40	30.25	10	60	11.80
3	40	32.00	8	60	12.10
2½	30	33.75			
2	24	52.50			

* Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Cast elliptical, 18 in. or longer, 5000 lb lots	58.92
Electrodeposited	55.25
Brass, 80-20, ball anodes, 2000 lb or more	58.00
Zinc, ball anodes, 2000 lb lots (for elliptical add 2¢ per lb)	20.75
Nickel, 99 pct plus, rolled carbon (rolled depolarized add 3¢ per lb)	90.50
Cadmium	$1.70
Tin, ball anodes and elliptical	$1.06 to $1.10

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	83.50
Copper sulphate, 5 or more 100 lb bags, per cwt	18.15
Nickel salts, single, 4-100 lb bags	33.25
Nickel chloride, freight allowed, 300 lbs	43.50
Sodium cyanide, domestic, fob N. Y. 1 to 4 200 lb drums (Philadelphia add .50 per lb)	21.55
Zinc cyanide, 100 to 900 lb	55.55
Potassium cyanide, 100 lb drum N. Y.	48.00
Chromic acid, flake type, 1 to 20 100 lb drums	31.20

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolt

	Discounts Full case Quantity	Full case 20,000 lb. or more
½ in. & smaller x 6 in. & shorter	61	63
Larger than ½ in. diam. and all diam. longer than 6 in.	55	57
Rolled thread carriage bolts ½ in. & smaller x 6 in. and shorter	61	63
Lag, all diam. x 6 in. & shorter	61	63
Lag, all diam. longer than 6 in.	55	57
Plow bolts	61	63

Nuts, Hex., H.P., reg. & hvy.

¾" or smaller	64	66
⅞" to 1¼" inclusive	63	65
1⅜" to 1½" inclusive	65	67
1⅝" and larger	61	63

C.P. Hex regular & hvy.

¾" or smaller	64	66
⅞" and larger	61	63

Hot Galv. Nuts (all types)

1½" or smaller	44	47

Finished, Semi-finished, Hex. Nuts

¾" and smaller	66	66
⅞" and larger	63	63

Add 25% for less than case or keg quantity.

Rivets

	Base per 100 lb
½ in. and larger	$9.95
	Pct Off List
7/16 in. and smaller	32

Cap Screws

	Discount Bright	H.C. Heat
New std. hex head, packaged		
¼" thru ½" diam. x 6" and shorter	34	20
9/16" and ⅝" x 6" and smaller and shorter	31	16
¾", ⅞", 1" x 6" and shorter	9	+11
New std. hex head, bulk*		
¼" thru ½" diam. x 6" and shorter	49	41
9/16" and ⅝" diam. x 6" and shorter	43	39
¾", ⅞", 1" x 6" and shorter	31	20

*Minimum quantity per item:
15,000 pieces ¼", 5/16", ⅜" diam.
5,000 pieces 7/16", ½", 9/16", ⅝" diam.
2,000 pieces ¾", ⅞", 1" diam.

Machine Screws & Stove Bolts

		Discount Mach. Screws	Stove Bolts
Packaged, package list		27	38
Bulk, bulk list	*Quantity*		
¼-in. diam. & under	25,000-200,000	20	61
5/16-in. diam. & larger	15,000-100,000	20	61
All diam. over 3 in. long	5,000-100,000	—	61

Machine Screw & Stove Bolt Nuts

		Discount Hex	Square
Packaged, package list		24	27
Bulk, bulk list	*Quantity*		
¾-in. diam. & smaller	25,000-200,000	18	20

CAST IRON WATER PIPE INDEX

Birmingham	109.3
New York	121.5
Chicago	122.9
San Francisco-L. A.	131.1

Dec. 1955 value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1 issue. Source: U. S. Pipe and Foundry Co.

REFRACTORIES

Fire Clay Brick *Carloads per 1000*

First quality, Ill., Ky., Md., Mo., Ohio, Pa., (except Salina, Pa., add $5.00)	$122.00
No. 1 Ohio	
Sec. quality, Pa., Md., Ky., Mo., Ill.	114.00
No. 2 Ohio	98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	18.00

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$128.00
Childs, Hays, Pa.	138.00
Chicago District	138.00
Western Utah	144.00
California	151.00
Super Duty	
Hays, Pa., Athens, Tex., Windham, Warren, O.	145.00
Curtner, Calif.	163.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	21.00
Silica cement, net ton, bulk, Hays, Pa.	24.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala.	22.00
Silica cement, net ton, bulk, Utah and Calif.	32.00

Chrome Brick *Per net ton*

Standard chemically bonded, Balt.	$91.00
Standards chemically bonded, Curtner, Calif.	101.25
Burned, Balt.	85.00

Magesite Brick

Standard Baltimore	$114.00
Chemically bonded, Baltimore	102.00

Grain Magnesite St. ¾-in. grains

Domestic, f.o.b. Baltimore in bulk fines removed	$64.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.	
in bulk	40.00
in sacks	46.00

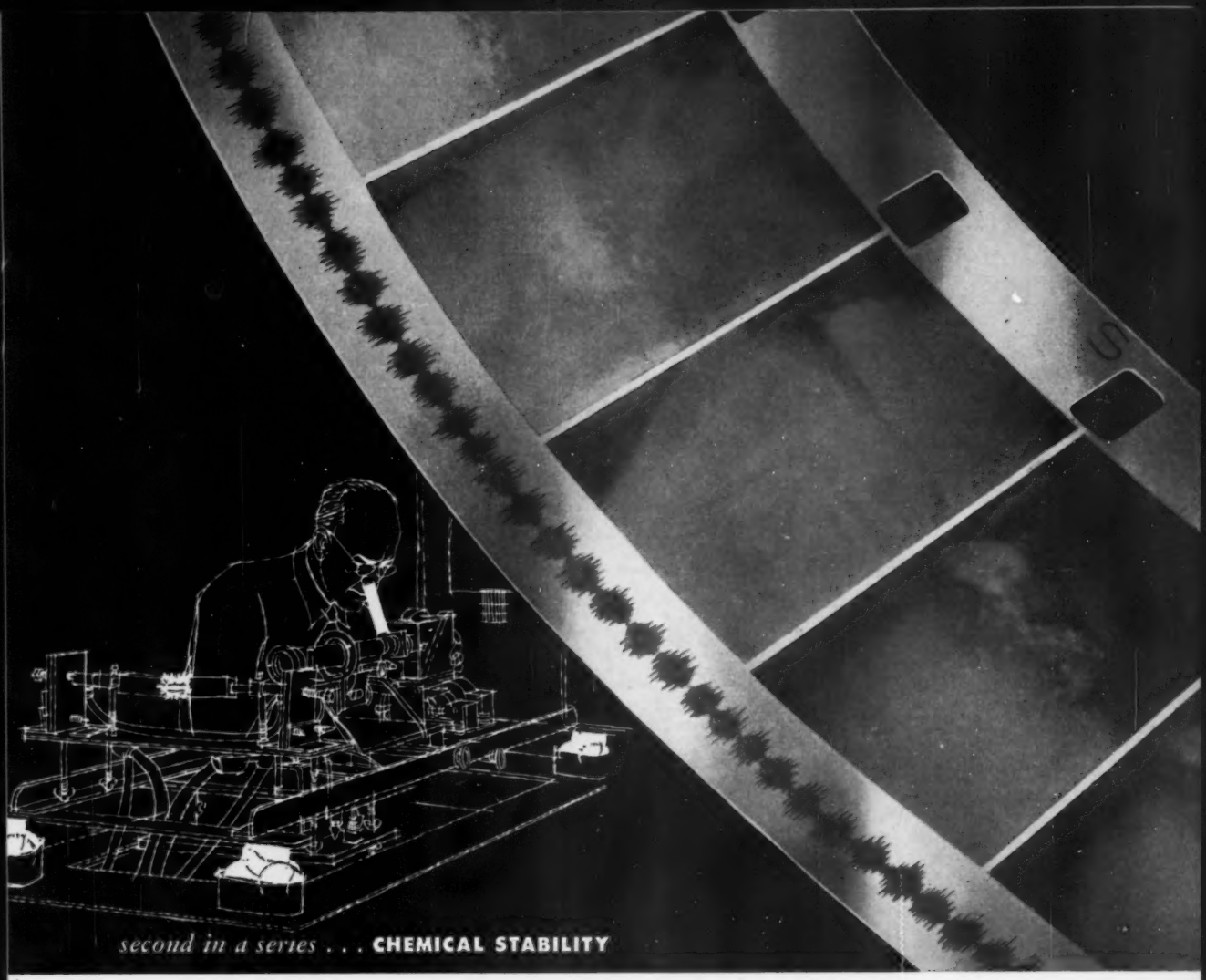
Dead Burned Dolomite *Per net ton*

F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	$15.00
Midwest	15.60
Missouri Valley	14.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	9.50¢
Canadian sponge iron, Del'd in East, carloads	9.5¢
Domestic sponge iron, 98+% Fe, carload lots	9.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	27.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe	57.0¢
Electrolytic iron melting stock, 99.84% pure	22.0¢
Carbonyl iron size 5 to 10 micron, 98%, 00.8+% Fe	86.0¢ to $1.55
Aluminum freight allowed	34.50¢
Brass, 10 ton lots	37.50¢ to 50.00¢
Copper, electrolytic	61.50¢
Copper, reduced	61.50¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic 99.85% min. Fe .03 max. Del'd	$5.00
Lead	7.50¢ plus metal value
Manganese	70.0¢
Molybdenum, 99%	$3.00 to $3.25
Nickel, unannealed	$1.00
Nickel, annealed	$1.06
Nickel, spherical, unannealed, #80	$1.18
Silicon	43.50¢
Solder powder 7.0¢ to 9.0¢ plus met. value	
Stainless steel, 302	99.0¢
Stainless steel, 316	$1.32
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	$4.50
Zinc, 10 ton lots	18.75¢ to 32.50¢



Comparative stability of MONOFRAX® fused cast refractory (left) vs. fireclay (right) . . . under attack by molten glass, as viewed through the high temperature microscope — one of Carborundum's most useful test facilities. (16 mm. frames shown are not consecutive.)

Unusual Properties of Refractory Materials

Chemical stability — Even under high temperature attack by gases, acids, corrosive solutions, molten salts and molten metals — the chemical stability of CARBORUNDUM'S super refractories enables them to fill industrial requirements that other refractories are unable to meet. For this reason, they are being used with increasing frequency in critical applications: i.e. as linings in controlled-atmosphere furnaces, in the production of muriatic acid, as radiant tubes, in the submerged combustion of liquids containing free acid — such as mixed chlorides and sulphates of iron, zinc, mercury and tin; in retorts for reducing and refining zinc, melting copper alloys and for hundreds of similar applications.

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Ferroalloy Prices

(Effective Feb. 28, 1956)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk carloads, del'd, 67-71% Cr, .30-1.00% max. Si.

0.02% C	38.50	0.20% C	35.50
0.03% C	38.00	0.50% C	35.25
0.06% C	36.50	1.00% C	34.00
0.10% C	36.00	1.50% C	33.85
0.15% C	35.75	2.00% C	33.75

4.00-4.50 C, 67.70% Cr, 1-2% Si ... 26.25
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si ... 25.00
0.025% C (Simplex) ... 31.75

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.27
0.50% max. C	1.27
9 to 11% C, 88-91% Cr, 0.75% Fe	1.36

Electrolytic Chromium Metal

Contract prices per lb of metal 2" x D plate (⅛" thick) delivered packed. 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	1.25
Ton lots	1.27
Less ton lots	1.29

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 3-in. x down, per lb of Cr, packed.

Carloads	41.85
Ton lots	46.15
Less ton lots	48.65

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.
30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads	22.95
Ton lots	25.25
Less ton lots	26.75

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	23.05
Ton lots	24.95
Less ton lots	25.95

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	19.65
Less ton lots	20.90

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	17.20
Ton lots	18.70
Less ton lots	19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.50
Ton lots to carload packed	19.65
Less ton lots	20.90

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	10.25
Johnstown, Pa.	10.25
Sheridan, Pa.	10.25
Philo, Ohio	10.25
S. Duquesne	10.25

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	12.50
Ton lots packed	14.70

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$89.50
19 to 21%	3% max.	91.50
21 to 23%	3% max.	94.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, Packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	30.00
Ton lots	32.00
250 to 1999 lb	34.00
Premium for hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn ... 22.35

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	33.00	35.55	36.75
0.07% max. C	30.95	33.50	34.70
0.10% max. C	30.20	32.75	33.95
0.15% max. C	29.45	32.00	33.20
0.30% max. C	27.95	30.50	31.70
0.50% max. C	27.45	30.00	31.20
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	24.45	27.00	28.20

Silicomanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carload bulk	11.50
Ton lots	12.95
Briquet contract basis carloads, bulk, delivered, per lb of briquet	13.15
Ton lots, packed	15.35

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $98.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96.50% Si, 2% Fe	22.75	21.45
98% Si, 1% Fe	23.25	21.95

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	7.15
Ton lots, packed	9.75

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si	12.75	75% Si	15.40
65% Si	14.50	85% Si	17.10
		90% Si	18.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.

Openhearth	3.10
Crucible	3.20
High speed steel (Primos)	3.30

Alsifer, 20% Al, 40% Si, 40% Fe,

Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	10.65¢
Ton lots	11.80¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo ... $1.34

Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	$6.90
Less ton lots	6.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb con't Cb plus Ta ... $4.65

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo ... $1.54

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton ... $90.00
10 tons to less carload ... $110.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti ... $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti ... $1.50
Less ton lots ... $1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton ... $177.00

Ferrotungsten, ¼ x down, packed, per pound contained W, ton lots, delivered ... $3.45

Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. ... $1.33
bags, f.o.b. Washington, Pa., Langeloth, Pa. ... $1.30

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk lump	17.50¢
Ton lots, packed lump	19.50¢
Less ton lots	20.00¢

Vanadium oxide, 86 - 89% V_2O_5 contract basis, per pound contained V_2O_5 ... $1.33

Zirconium contract basis, per lb of alloy
35-40%, f.o.b. freight allowed, carloads, packed ... 26.25¢
12-15%, del'd, lump, bulk-carloads ... 8.50¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed. B, 3.14%, Si 40-45%, per lb contained 2 ... $5.25

Bortam, f.o.b. Niagara Falls
Ton lots, per pound ... 45¢
Less ton lots, per pound ... 50¢

Corbortam, Ti 15-21%, B 1-2% Si 2-4%, Al 1-2%, C 4.5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed
Ton lots per pound ... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50%, max. Al, 0.50% max. C, 1 in. x D, ton lots ... 1.20
F.o.b. Wash., Pa.; Niagara Falls, N. Y. delivered 100 lb up

10 to 14% B	.85
14 to 19% B	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over

No. 1	$1.05
No. 79	50¢

Manganese - Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots	$1.46
Less ton lots	1.57

Nickel-Boron, 15-18 B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots ... $2.05

Welding Feature Issue Preview

FOR READERS . . . the April 26th issue of The IRON AGE will offer dollar-saving ideas that show how you can get the most from your welding equipment.

1 Choosing the Right Process. Which are most suitable for welding carbon steels? Austenitic stainless steels? Cast iron? How do the various processes rate for welding aluminum, copper and nickel?

2 What About Economy? When should you automate and to what extent? Or is manual welding your best bet? Pointers on equipment, labor and cleaning costs.

3 Shielding Media. Are you using the right inert gas? Advantages of gas mixtures for certain metals. Can CO_2 or nitrogen cut costs on your jobs?

4 New Techniques. Where and how you can use them effectively. What's to be gained by their application? In time? Costs? Materials? Labor? Quality?

5 Difficult-To-Weld Metals. Which process and to what thicknesses is it usable? Advantages as well as limitations. Pitfalls to avoid. Metallurgical problems and ways of overcoming them.

6 Comparable Electrode Charts. Lists arcwelding electrodes for steel, stainless steel, copper, armor plate, etc. Shows the specifications and the rods to fill them. Also tells who makes them.

7 Availability of Other Rods. What rods to use for processes other than metal arcwelding. For aluminum, magnesium, stainless steel, copper, nickel and construction steels? Brazing rods are included.

FOR ADVERTISERS . . . it offers an opportunity to tie in with the third major editorial effort in The IRON AGE "How To Get More For Your Metalworking Dollar" series . . . a series which is getting unprecedented attention among executives throughout metalworking.

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Portrait by Fabian Bachrach

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WHITLEY COLLINS, ***President***
Northrop Aircraft Company

If less than 60% of your personnel are Payroll Savers, do something about it. A phone call, telegram or letter to Savings Bonds Division, U. S. Treasury Department, Washington, D. C., will bring prompt assistance from your State Director. He will help you install, or revitalize a Payroll Savings Plan, through a simple, person-to-person canvass which your personnel will be glad to conduct. That's all you have to do—your men and women will do the rest.

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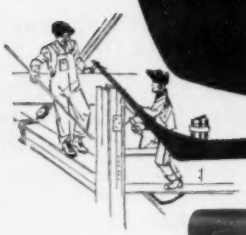

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. . . get metallic arc welding jobs done in a superior, time saving way **because:**

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- No moving parts, plus excellent electrical qualities reduce maintenance and operating costs. Here's savings.

Available in 200, 300, or 400 ampere models with ratings at 60% duty cycle. Power Factor Correction can be supplied.

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"ANYTHING containing IRON or STEEL"

News of Used and Rebuilt Machinery

What About Detroit Business? . . . If first quarter business is any indication, the market for used machines this year is going to be very good in Detroit.

Dealers, in some cases, have been beating the bushes for good used equipment since the first of the year and there is no sign of a letup so far in demand.

The source of most of the local business is tool and die shops in the area that are working on the 1957 automotive programs. Locally, the demand for tool room equipment is very good.

Out-of-Area Inquiries Increase . . . The number of inquiries from outside the state has also increased during the past month.

Many of these calls are for late model screw machines ranging in size from 1 to 3½ in.

In most cases, the source of this business is the automotive industry or small shops that produce specialty items that can't be cold-headed.

Screw machine inquiries have been coming in from as far off as the West Coast. The calls are mostly from shops supplying the aircraft industry and indicate the shortage which exists in Western areas.

Business Prospects Bright . . . Local predictions are that Detroit business will remain at a high level generally for the next 6 months and possibly longer. There are two prime reasons for the optimism:

First, the Chicago show increased the demand for new machines. As new equipment is acquired, older machines are sold and a cycle is started that naturally steps up the demand.

In the second place, the new model program in the auto industry is now in full swing and, with tool and die shops in Detroit working 7 days a week, the outlook is extremely bright.

How About Auctions? . . . Machinery sold at auctions is still bringing exorbitant prices, according to the dealers.

In one reported instance, Warner and Swazey lathes sold for $8250, compared to $9000 for a new machine.

In another case, a universal grinder worth approximately $7500 was sold at auction for $10,000.

Why the Premium Prices? . . . Most dealers believe that purchasers bid prices up because they can't wait for delivery of new equipment.

There is also, they point out, a psychological factor involved at these sales. Purchasers sometimes become so mesmerized that they can't help but keep bidding the price up.

These two factors combined, dealers claim, have created an artificial atmosphere at the sales. As a result, some dealers won't attend auctions any more.

News Strike Didn't Hurt . . . None of the dealers in the Detroit area suffered any great loss because of the local newspaper strike.

The small newsheet put out by the Machinery Dealers National Association filled a good part of the gap as far as local advertising was concerned.

In a number of instances, local dealers actually increased the amount of their out-of-area advertising and this is cited as one reason for the sudden spurt of outside interest in the Detroit area.

What's Selling Best? . . . Hottest sales item in Detroit right now is large presses. Next come lathes, boring mills, screw machines, universal grinders, and drill presses.

The increase in buyer activity is expected to keep dealers busy both locally and out-of-area for months.

CONSIDER GOOD USED EQUIPMENT FIRST

ANGLE BENDING ROLLS
1¾"x1¾"x¼" Niagara No. 3
4½"x4½"x⅝" Ampiex PRR Horizontal
BALERS
#123P-66 Logemann, Charging Box 66x18x24. Produces Bale 125 to 150 lbs.
Logemann Baler, Charging Box 72x12x18". Produces 300 lb. Bale
BENDING ROLLS
8' x ⅜" Hilles & Jones Pyramid Type
12' x ⅝" Cleveland Pyramid Type
16' x ¼" Bertsch Initial Type Bending Roll
24' x ½" Hilles & Jones Pyramid Type
BRAKES—LEAF TYPE
12' x ⅝" Dreis & Krump
12' x ½" Dreis & Krump, Motor Driven
BRAKE—PRESS TYPE
14' x ¼" Cincinnati Series 120-14
BROACH
Model VP-4-40-40 American Vertical Hydr. Broach. Max. Capacity 60 ton. Stroke 40", Motor Drive
BULLDOZER
#27 Williams & White, 22" Stroke, 16" x 80" Face of Crosshead
CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton P&H	29' Span 230 Volt D.C.
5 ton Cleveland	96' Span 230 Volt D.C.
7½ ton P&H	65' Span 440/3/60 A.C.
10 ton P&H	58' Span 230 Volt D.C.
10 ton Milwaukee	80' Span 230 Volt D.C.
10 ton P&H	96' Span 230 Volt D.C.
15 ton Northern	48' span 220/3/60 A.C.
20 ton P&H	69' Span 230 Volt D.C.
20 ton Toledo	75' Span 550/3/60 A.C.
30 ton Alliance	50' Span 230 Volt D.C.
120 ton Whiting	80' Span 220/3/60 A.C.

FLANGING MACHINES
⅝" McCabe Pneumatic Flanging Machine
1" McCabe Pneumatic Flanging Machine
FORGING MACHINE
1" to 5" Acme, Ajax, National
FURNACES
Hevi-Duty Electric Furnace, Hot Zone 18" high, 26" Wide Opening, 10'9" Deep I.D.
Sunbeam, Stewart Gas Fired Furnace 12" x 36" x 36"
15 ton Heroult Top Charge
GRINDER—ROLL
20' x 96" Landis, With Crowning Attachment
HAMMERS—BOARD DROP—STEAM DROP STEAM FORGING—800 lb. to 20,000 lb.
HAMMERS—MISC.
#3B Lobdell Nazel, Capacity 4" Square
2000 lb. Chambersburg Ceco-Drop
LEVELLERS—ROLLER
18" United, 13 Rolls 1½" Dia.
60" Mesta Four High, 17 Rolls 5¼" Dia.
98" Aetna-Standard, 19 Rolls 2½" Dia.
PLANERS—PLATE EDGE
30' x 1¼" Southwark, 16 Pneumatic Jacks
35' x 1½" Southwark, 16 Pneumatic Jacks
PRESSES—HYDRAULIC
550 ton Baldwin Southwark 12" Stroke 48" x 25" Between Columns
800 ton Clearing 48" Stroke, Bed Area 48" x 48"
1000 ton Lake Erie Double Acting 46" Stroke, Bed Area 72" x 146"
1257 ton Baldwin Southwark Forging Press, 30" Stroke Main Ram, 54" x 41" Bet. Columns
2045 ton Birdsboro, 4 Columns, 14" Stroke Piston Platen 42" x 40" Daylite 47"
4500 ton B-L-H Hydr. Forging Press
PRESSES—STRAIGHT SIDE
#8½ 4P Zeh & Hahnemann Percussion Press 75 ton Clearing Model TF41500-200 Triple Acting, Strokes 40, 32, 14". Bed Area 100" x 200"
Verson 81-40 Mech. Eccentric Type Single Point Suspension Press, 200 ton, 30' Stroke
PUNCH & SHEAR COMBINATIONS
#1½ Buffalo Universal Ironworker
Style EF Cleveland 60" Throat, Punch 1¼" thru 1"
Style EF Cleveland 36" Throat, Punch 1¼" thru 1"
Style W Cleveland Single End. 60" Throat, 312 Ton
ROLLS—PLATE STRAIGHTENING
60" McKay Universal, 7 Rolls 10" Dia.
72" Bertsch, Seven 7" Dia. Rolls
ROLLING MILLS
12" x 16" Phila. Single Stand, Two High
15" x 28" Farrel Single Stand. Two High
15" x 30" G & M Single Stand. Two High
16" x 24" Farrel Single Stand. Two High
22" x 46" Achen, Single Stand. Two High
22" x 12" x 40" Lewis 3-High Sheet Mill
ROLLS—FORMING
8 Stand Rafter Tube Forming Machine, Spindle 1⅞"
5 Stand Bliss Roll Forming Machine, Shaft 2⅞"
SHEARS—GATE
60" x 1" Pels
80" x ⅜" Pels
120" x 1" Hilles & Jones
SHEAR—ANGLE
6 x 6 x ⅝" Hilles & Jones
SHEAR—BAR
#4 H & J Guillotine, Capacity 3½" Square, 4" Round
SHEARS—SQUARING
12' x 3/16" Cincinnati #1412
12' x ⅜" Loy & Nawrath
SLITTERS
G-48 Yoder Gang Slitter, 5" Threaded Arbor
5-30 Yoder Slitter, 7" Plain Arbor
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100,000, 200,000# Olsen & Richle Universal; 50,000 & 300,000# Compression

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SLIP RING

Qu.	H.P.	Make	Type	Volts	Speed
1	1500	G.E.	MT-498	2300	360
1	1000	A.C.	Mill	2300	240
1	800	G.E.	MT	2300	282
1	750	G.E.	MT-573	2300	1190
1	700	A.C.		2300	500
1	500	G.E.	MT-413	2300	580
1	500	Whse.	CW	550	350
1	500	G.E.	M-569Z	2200	1180
1	400	Whse.	CW-960A	440	1170
1	400	Whse.	CW	440	514
1	400	Whse.	CW-1213	2200	435
1	350	G.E.	MT-442Y	2200/4000	253
1	350	G.E.	IM-17A	440/2200	720
1	350	G.E.	MT-424T	4000	257
1	250	G.E.	MT-559B	2200	1800
1	250	Al. Ch.		550	600
1	200*	Cr. Wh.	36QB	440	505
1	200	G.E.	IM	440	435
1	200	G.E.	IM	2200	580
1	150(unused)	Whse.	CW	2300	435
2	125	A.C.		440	865
1	125	Al. Ch.		440	720
1	100	G.E.	IM-16	2300	435
1	100	G.E.	IM	440	600
4	100	A.C.	ANY	440	695

SQUIRREL CAGE

1	800	G.E.	KT-573	2300	1180
2	650	G.E.	FT-559BY	440	1570
1	500	G.E.	K-6345-S	2300	1185
2	450	Whse.	CR-1429	2300/4150	1764
1	400	G.E.	IK-15B	2200	1165
1	400	G.E.	IK	2300	500
1	200	G.E.	IK-17	440	589
3	200	G.E.	KT-557	440	1800
1	150/75	G.E.	IK	440/900/450	
1	150	Whse.	CR-8548	440	880
1	150	Whse.	CR	440	880
2	125	Al. Ch.	ARW	2200	1750
1	100	Whse.	CR-876C-TEFC	440	710

SYNCHRONOUS

2	2000	Whse.		2300	120
2	1750	G.E.	ATI	2300	3600
2	735	G.E.	ATI	2200/12000	600
1	500	Ideal	SM	2200/4160	1800
2	500	G.E.	TS-7547	2200	1200
1	450	Whse.		2200	138.5
1	450	Whse.		2200	450
1	400	G.E.	TS-7585	2300	1200
1	400	G.E.	TS	2300	400

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Qu.	H.P.	Make	Type	Volts	R.P.M.
2	3000	Whse.	Mill	525	600
6	1500	Whse.	Mill	525	600
1	1250	G.E.	MCF	600	350/790
4	800	Whse.	Encl.	525	600
4	700	Whse.	Mill	250	300/700
2	600	Al. Ch.	Mill	600	300/600
2	500	Whse.	Mill	250	285/710
1	450/250	Al. Ch.	Mill	375/250	250/1000
1	450	Whse.	SK	230	450/600
1	350	G.E.	CD-169	230	1150
1	200/250	Et. Dy.	Ped. Brg.	230	400/1200
1	200	Whse.	SK-210	230	400/800
1	180	G.E.	MPC	230	400
1	150	Whse.	SK-201	230	300/900
2	125	Whse.	SK-184	230	575/850
1	125	G.E.	MPC	230	400/600
1	100	Et. Dy.	36-S	230	450/1350
2	100	Et. Dy.	36-S	230	475/950
1	80	Reliance	651-T	230	575/1150
3	50	Whse.	SK-181.5	230	600/2200
1	40	G.E.	CD-123	230	500/1000
1	40	Whse.	SK-140	230	500/1700
1	32½	Whse.	SK-150	230	400/1200
2	25	Whse.	SK-93	230	1800
1	20	Cr. Wh.	D.P.B.B.	230	1150/2400
1	20	Whse.	SK-123	230	400/1200
1	15	G.E.	CD-85	230	575/2200
3	15	Whse.	SK-100L	230	580/1500
1	15	Reliance	156-T	230	400/1600
1	10	Whse.	SK-103	230	400/1600
1	10	Al. Ch.	E-122	230	300/1200
4	10	Whse.	SK-91	230	250/1000
1	7½	G.E.	CD-75	230	400/2070
1	7½	G.E.	CD-85	230	450/1350
4	5/7½	Reliance	T.E.F.C.	230	337/1350

MOTOR GENERATOR SETS

Qu.	KW	Make	R.P.M.	D.C. Volts	A.C. Volts
1	2500	Whse.	720	600	4160/2300
2	1250	Whse.	720	600	2300
1	500	Cr. Wh.	720	600	2300/440
2	500	Whse.	1200	125/250	2300/440
1	400	Cr. Wh.	1200	125/250	2300/440
1	300	G.E.	1200	250	2300
3	200	G.E.	900	125/250	2300
1	150	G.E.	1200	250	2300
1	100	Whse.	900	250	2300
1	100	Cr. Wh.	1200	125	440/220
1	75	G.E.	1200	250	440/220
3	50	G.E.	1200	250	440/220

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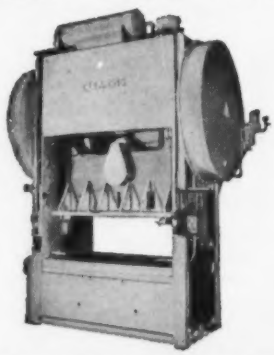

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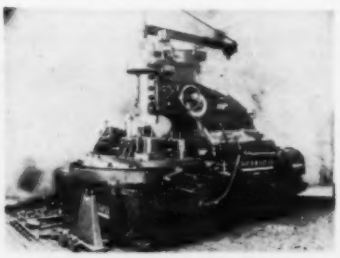

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An asterisk (*) beside the name of advertiser indicates that a booklet, or other information, is offered in the advertisement. Write to the manufacturers for your copies today.

A

Air Products, Inc. 151
*Ajax Electric Co., Inc. 4, 121
Ajax Electric Furnace Corp...4, 121
*Ajax Electrothermic Corp. ...4, 121
Ajax Engineering Corp. 4, 121
Amco Machinery Co. 147
American Air Compressor Corp. 147
American Brass Co., The 48
*American Gas Furnace Co. ... 61
*American Monorail Co., The ... 12
*Armco Steel Corp. 6
Armel, James P. 146
*Armstrong Bros. Tool Co. 116
*Atlas Car & Mfg. Co., The 95
*Atlas Mineral Products Company 118

B

Bacon, Frank, Machinery Co..... 148
Baldt Anchor, Chain & Forge Div. 150
Baldwin-Lima-Hamilton Corp. Construction Equipment Div. .. 63
Barron Machinery Co. 147
Bay City Forge Co. 149
Belyea Co., Inc. 145
Bennett Machinery Co. 145
Bethlehem Steel Co. 1
Bound Brook Oil-Less Bearing Co. 83
Bristol Brass Corp., The 58
Brownell, Hazard, Machine Tools, Inc. 146
*Burt Mfg. Co., The 100

C

*Corborundum Co., Refractories Div. 139
Carlson, G. O., Inc. 22
*Carpenter Steel Co., The Alloy Tube Div. 117
Cattie, Joseph P., & Bros..... 153
*Challenge Machinery Co., The 92
Chicago Concrete Breaking Co. 154
Chicago Rawhide Manufacturing Co. 66
*Cincinnati Shaper Co., The ...96, 97
*Cleveland Cap Screw Co., The. 131
*Cleveland Metal Abrasive Co., The 113
*Cleveland Tramrail Division The Cleveland Crane & Eng Co. 16
Cold Metal Products Co., The .. 26
Colorado Fuel & Iron Corp., The 64, 65
Commercial Die Co. 149
Conco Engineering Works Crane & Hoist Div. 85
Consolidated Railway Equipment Co. 148
Continental Steel Corp. 94
*Copperweld Steel Co., The Inside Front Cover
Crawford, F. H., & Co., Inc..... 146
Crucible Steel Casting Co. 143
Crucible Steel Co. of America.. 91
Curry, Albert, & Co., Inc..... 147
*Cutler-Hammer Inc.....Back Cover

D

Darien Corp, The 149
Davis Keyseater Co. 153
*Diamond Manufacturing Co. .. 152
Donahue Steel Products Co., Inc 147, 151
Dony, D. E., Machinery Co..... 146
Du Pont de Nemours, E. I. & Co., Inc., Electrochemicals Dept. .. 105
Duraloy Co., The 112

E

*Eastern Machine Screw Corp., The .....114 & 149
Eastern Machinery Co., The 146
Eaton Mfg. Co., Foundry Division 46
*Elastic Stop Nut Corp. of America 133
Electro Manganese Corporation 120
Electro Metallurgical Co., a Div. of Union Carbide & Carbon Corp. 14, 15
Espen-Lucas Machine Works, The 153
Eveready Supply Co. 149
Ex-Cell-O Corporation 122

F

Fabrikant Steel Products, Inc... 148
*Fairfield Manufacturing Co. ... 104
Falk Machinery Co. 145
Fenn Manufacturing Co., The ... 88
Foster, L. B., Co. 148
Frank, M. K. 148

G

Gem Clay Forming Co., The 149
General Machine Works 149
Goodman Electric Machinery Co. 146
Goodrich, B. F., Co., Industrial Products Div. 39
Goodyear Tire & Rubber Co. ... 10
Goss & DeLeeuw Machine Co. ... 153
Great Lakes Steel Corp. 43
Greist Manufacturing Co., The .. 150
Griffin Manufacturing Co. 152

H

Hardinge Mfg. Co. 150
*Harrington & King Perforating Co., The 60
Haynes Stellite Company, a Div. of Union Carbide & Carbon Corp. 23
Henry, A. T., & Company, Inc. 145
Hofmann, A. Jay, Co..... 148
Holcroft & Company 62
*Hough, Frank G., Co., The..... 101
Huebel Mfg. Co., Inc. 150
Hughes, Arnold, Co. 151
Hughes Tool Co. 146
*Hyatt Bearings Div. General Motors Corp. 50
Hyman, Joseph, & Sons 146

ADVERTISERS IN THIS ISSUE

I

Illinois Gear & Machine Co. 109
Impax, Inc. 149
Independent Engineering Co., Inc. 114
*International Nickel Co., Inc., The .....Between Pages 16 & 17
Iron & Steel Products, Inc. 144

J

Jennings, Jira Thayer 151
*Jones & Laughlin Steel Corp... 119
Jones & Laughlin Steel Warehouse Division 20, 21

K

Kaplan, M. S., Company 129
Kasle Steel Corp. 148
Kidde, Walter, & Co., Inc. 13
King Foundries, Inc. 149

L

Land, L. J., Inc. 145
Lang Machinery Co. 146
Lansing Stamping Co. 120
Lewis Tar Products Co. 147
Linde Air Products Co., a Div. of Union Carbide & Carbon Corp. 17
Luria Bros. & Co., Inc. 127

M

MacCabe, T. B., Co..... 145
Mahon, R. C. Co., The 150
Marshall Railway Equip. Corp... 148
Martin, Joe, Co., Inc., The..... 151
Meriwether, George M. 146
Merrill Bros. 149
Miles Machinery Co. 147
Miller Electric Mfg. Co., Inc... 143
Mississippi Valley Equipment Co. 149
Morgan Construction Co. 5
Morrison Railway Supply Co. ... 148
Morton Machinery, Inc. 148
*Mundt, Chas., & Sons 152

N

National Acme Co., The 93
National Machinery Exchange ... 146
National Steel Corp. 43
New England Pressed Steel Co. 150
*Niagara Blower Co. 84
Norton Company 52

O

O'Neil-Irwin Mfg. Co. 9
Olson Manufacturing Co. 149
Ornitz Equipment Corp. 146

P

*Pearson Manufacturing Co. 148
Penn Crane-Rail Co. 153
Peterson Steels, Inc. 107
*Poole Foundry & Machine Co. ... 153
Power Press Specialists 146
Purdy Company, The 148

R

Reliance Electric & Engineering Co. 56
*Republic Steel Corp. 18, 19
Roebling's, John A., Sons Corp. Between Pages 16 & 17
Russell, Burdsall & Ward Bolt & Nut Co. 45
Ryerson, Jos. T., & Son, Inc. Between Pages 24 & 25

S

Salem-Brosius, Inc. Between Pages 24 & 25
Saling Manufacturing Company.. 150
Sessions, J. H., & Son..... 106
*Shepard Niles Crane & Hoist Corp. 98
*Simonds Abrasive Co. 99
*Simonds Saw & Steel Co. 115
Smith, Thomas Co. 150
Standard Oil Co. of Indiana... 111
Standard Tube Sales Corp. 149
Stemm Bros., Inc. 151
Sun Oil Co. 54

T

Thomas Machine Manufacturing Co. 116
Timken Roller Bearing Co., The.. 40
*Trabon Engineering Corp Inside Back Cover
Tractor & Equipment Co. 147

U

Union Carbide & Carbon Corp. Electro Metallurgical Co. ...14, 15
Union Carbide & Carbon Corp. Haynes Stellite Co. 23
Union Carbide & Carbon Corp. Linde Air Products Co. 17
United States Steel Corp. 87

V

Valley Mould & Iron Corp. 8
*Victor Saw Works, Inc. 11

W

Wallack Bros. 151
Weatherly Foundry & Mfg. Co... 149
Weiss Steel Co., Inc. 151
*Wheelabrator Corp. 102
Wheland Co., The 106
Wigglesworth Industrial Corp. ... 145
Wilcox Forging Corp. 150
Willson Products, Inc. 86
Wood, R. E., & Sons 150

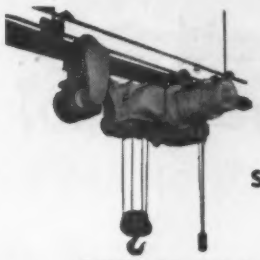
Y

Youngstown Sheet & Tube Co., The 24

CLASSIFIED SECTION

Business Opportunities 151
Clearing House 144-149
Contract Manufacturing 149-150
Employment Exchange 151
Equipment & Materials Wanted 150-151

CRANES—MONORAILS



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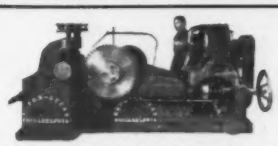

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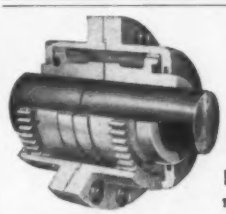

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500 TONS OF METAL BLASTED FROM SCALE PIT

What do you do when a mixer accidentally pours 500 tons of molten metal into the scale pit of an open hearth shop, putting the mixer completely out of production?

At 3:00 P.M. on a Wednesday in April, 1953 that question was put to CHICAGO CONCRETE. Although the job was over 2,000 miles away, a representative was on the scene appraising the damage in a matter of hours. Simultaneously he ordered out the manpower and equipment necessary to repair the damage while setting to work available manpower in cleaning up. Then . . . coupling the experience bred of 35 years of operation with the judicious use of dynamite, CHICAGO CONCRETE went to work. WITHIN DAYS THE ENTIRE MASS WAS REMOVED AND THE MIXER READY TO RETURN TO ITS JOB.

PRODUCTION TIME SAVED . . . 35 DAYS

By tried-and-proven-safe methods, CHICAGO CONCRETE removed that 500 tons of metal from the scale pit — taking care to safeguard the mixer itself throughout the entire operation. The savings to this mill in "down-time" was literally tens of thousands of dollars. This is another of many emergencies handled by CHICAGO CONCRETE every day, every week . . . handled by experienced men employing the utmost speed. You, too, can depend on CHICAGO CONCRETE in ANY emergency

CHICAGO CONCRETE CONSTRUCTION

Regardless of the size of the job — from a minor masonry, steel or foundation repair, to a complete furnace rebuild, CHICAGO CONCRETE offers you the know-how and facilities to handle any job. CHICAGO CONCRETE CONSTRUCTION COMPANY offers a COMPLETE industrial construction service . . .

CHICAGO CONCRETE BREAKING CO.

12233 S. AVENUE "O", Chicago 33, Ill., BAyport 1-8400

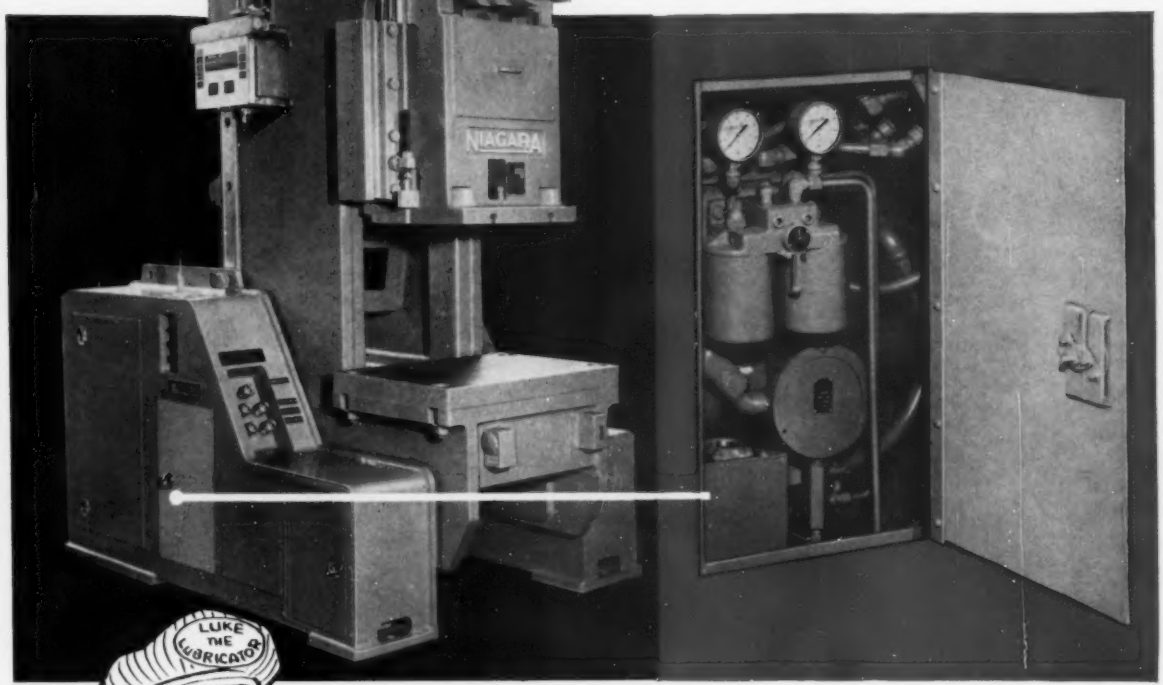
PITTSBURGH AREA - 213 Corey Ave., Braddock, Pa., Electric 1-1656

SERVING THE PRIMARY METALS AND OIL INDUSTRIES WITH KNOW HOW, EQUIPMENT AND MANPOWER FOR 35 YEARS

MASTERFUL ENGINEERING . . . . . .

Trabon Meterflo

AUTOMATIC LUBRICATION ON NIAGARA INCLINABLE PRESSES



TRABON "METERFLO" systems automatically circulate clean, filtered oil under pressure to all bearings; air counter-balance; and slide gibs, on the new Niagara front-to-back crankshaft open back inclinable presses illustrated.

TRABON'S exclusive warning devices react immediately to the inability of any bearing or line to receive oil. The positive progressive action of the piston type distributors is stopped, causing pressure switch to stop the press.

Another example of the application of the World's Finest Automatic Lubrication for Automation or Single Purpose equipment.

Trabon ENGINEERING CORPORATION

1814 E. 40th STREET • CLEVELAND 3, OHIO

Oil and Grease Systems

Industry Here Finds Savings in the Stars

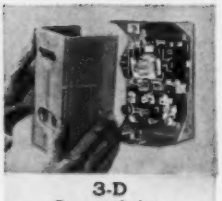
Cutler-Hammer Three-Star Motor Control

Thousands of electric motor users now know the three silver stars on the nameplates of the new Cutler-Hammer Three-Star Motor Control are no meaningless decoration. They stand for three entirely new standards in motor control value and performance . . . for important practical economies no industrial plant can afford to ignore.

Compare Cutler-Hammer Three-Star Control with all other control and *see* the difference. It installs easier . . . so much easier that savings in installation costs often pay for this control. It works better . . . so much better that this control often pays for itself many times over just by the production interruptions it avoids. It lasts longer . . . so much longer that this control *never* requires maintenance care or cost in all normal use. Make your own comparisons and *know*.

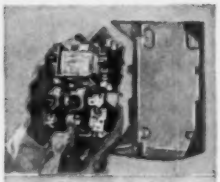
Your nearby Cutler-Hammer Authorized Distributor is stocked and ready to serve you. Order from him today. CUTLER-HAMMER, Inc., 1325 St. Paul Avenue, Milwaukee 1, Wisconsin.

CUTLER-HAMMER
★ ★ ★
MOTOR CONTROL
C-H



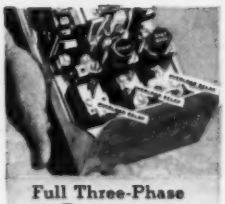
3-D Accessibility

Removing the wrap-around cover bares the entire starter for three-directional accessibility. It is wide open at front and both sides. You can see everything and reach anything. Wiring the starter is so simplified and complete inspection is so easy no detail is ever neglected.



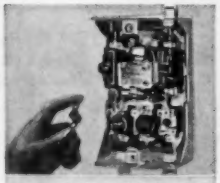
Unit Panel Construction

The entire starter mechanism can be removed from its case by simply loosening three screws. With mechanism out of the way, mounting case, connecting conduit and pulling wires is a cinch. A great time saver. No skinned knuckles. No damaged starter mechanisms.



Full Three-Phase Protection.

Only *three* overload relays can provide positive three-phase protection to stop needless motor burn-outs and production interruptions. And only Cutler-Hammer offers three overload relays in standard starters to avoid the costs and delays in special construction.



Adjustable Overload Coils

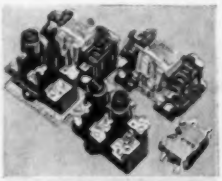
Only the accurate adjustment of overload protection permits motors to work harder without damage. Now more important than ever with newer type small frame motors. Adjustable overload coils here provide an accuracy of 3% instead of 10% to 12% in other makes of control.

Superlife Vertical Contacts

Now the famous Cutler-Hammer dust-safe vertical contacts have been doubly improved. New light-weight design cuts bounce to reduce arcing. Also, arcing is now pressure-quenched. Contact maintenance care and costs are ended for all time in normal control uses.

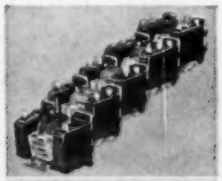
For Control Panel Designers

New Cutler-Hammer Three-Star Motor Control is star-studded with exclusive new features that provide opportunities for better circuit planning, for compact control panels, for better motor protection and better control performance. Write now on company letterhead for panel design handbook giving complete data.



New Control Components

All parts of the Three-Star Starters in NEMA Sizes 0, 1 and 2, as well as the complete starters on convenient unit panels, are available as components. Electrical interlocks provide additional control circuits as needed.



New Control Relays

Finest of control relays. 10 and 15 Amp. 2-3-4-5-6 poles. All contacts instantly convertible from NO to NC or vice versa. NO or NC status seen at a glance without removing cover. New armored coils color coded for voltage and frequency.

New Oil-Tight HD Pushbuttons

Amazingly compact, one-hole mounting, oil-tight, heavy-duty pushbutton units. Wide choice of button types and colors. Easily added additional contacts permit almost unlimited circuitry. Selector switches and indicating lights to match.